ELECTRICAL SOUTH

APRIL
1944

52-In Hotel Type

FANS by HUNTER-CENTURY

55th SEASON

24-In "Airspread" Ceiling

HUNTER, who has made fans and ventilators exclusively during 55 years, is now operating under War Production Board restrictions. • No more fans will be made except for the Army, Navy and Maritime Commission. HUNTER unfilled orders now on hand represent contracts with Government Agencies. • Certain sizes of belted exhaust types can be made available for Government hospitals and other war industries, subject to limited material inventories now on hand.

HUNTER FAN & VENTILATING COMPANY, INC.

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General Sales Offices: Memphis, Sterick Bldg. *Eastern Sales Office*: New York, 92 Warren Street *Western Sales Office*: St. Louis, 1706 Olive Street

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Zephair Comfort Cooling and Commercial Ventilators

Sales Offices:
BOSTON
CLEVELAND
DETROIT
KANSAS CITY
NEW ORLEANS
PITTSBURGH

Fluorescent operating hints

No. 1 of a series published by Sylvania for all users of fluorescent lighting.

HOW TO TEST LAMPS AND STARTERS

If a fluorescent lamp blinks or fails to light early in life, it does not necessarily indicate premature lamp failure. The trouble may be a defective ballast or a faulty starter. However, the first thing to do is to replace both the lamp and the starter with units known to be satisfactory. If the new lamp fails to operate with the new starter in place, loose connections in the wiring or ballast may be the reason, and the electrician should check the entire circuit.

To check the questionable lamp and starter that have been removed, test them in a fixture known to be performing properly, or return them to the maintenance shop for checking on a simply constructed test board.

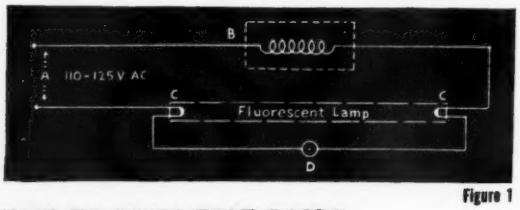


Figure 1

HOW TO MAKE TEST BOARD

Fig. 1 shows the wiring for a simple test board that can be used to check either lamps or starters. *A* is the connection to the 110-125 volt AC line. *B* is a single-lamp ballast of the same wattage rating as the lamp being tested in *C*, the lamp sockets. *D* is the starter socket.

Fig. 2

DUMMY-STARTER TESTER

For use with this test board, you can make a dummy-starter tester from a spare or used Sylvania starter by removing the can and connecting the two contacts permanently, Fig. 2. Replace the can and scratch it with a distinctive mark, so that it will not be mistaken for one of your regular starters.

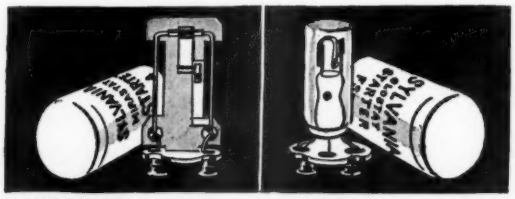
TESTING THE LAMP

Place the lamp to be tested in lamp sockets *C*, and place the dummy starter in socket *D*. If the lamp is good, both ends of it will glow when the dummy starter is in the socket; and the entire lamp will light when the dummy starter is *quickly* removed. If the lamp does not perform in this way, it is worn out and should be discarded.

HOW TO TEST STARTER

To test starters on the test board, put a lamp known to be good in sockets *C*, and put the questionable starter in socket *D*. If the starter is good, the lamp will light in less than 30 seconds.

(*CAUTION*: Test No. 2 starters with 15- or 20-watt lamps only; No. 4 starters with 30- or 40-watt lamps only; No. 5 starters with 6- and 8-watt lamps only; No. 6 starters with 100-watt lamps only; and No. 7 starters with 65-watt lamps only.)



MIRASTAT—Sylvania's thermal-type starter

GLOSTAT—Sylvania's glow-type starter

STARTERS ARE LAMP-LIFE INSURANCE

The fluorescent lamp starter is an automatic time-delay switch. Mechanically rugged, it enables the fluorescent lamp to establish its lighting arc without the use of high voltage.

Starters cost only a few cents — but they protect your really important investment in fluorescent fixtures and fluorescent lamps. Defective starters shorten lamp life and cause overheating in ballasts. It pays to test your starters and replace defective ones with Sylvania Mirastats or Glostats.

For Additional Maintenance Information

Send for this Free Booklet

☆ **SYLVANIA** ELECTRIC PRODUCTS INC.

SALEM, MASS.

INCANDESCENT LAMPS, FLUORESCENT LAMPS, FIXTURES AND ACCESSORIES, RADIO TUBES, CATHODE RAY TUBES, ELECTRONIC DEVICES

ELECTRICAL SOUTH is published monthly by W. R. C. Smith Publishing Co., Marietta, Ga., and Atlanta, Ga., U. S. A.
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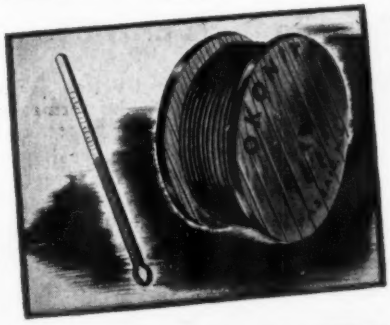
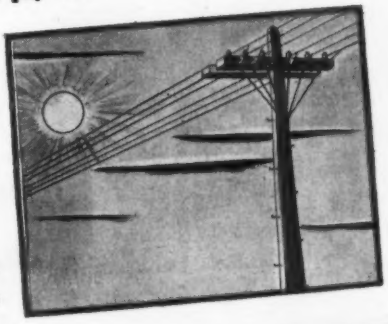
Volume 24 Number 4

HOW TO PROTECT WIRES AND CABLES FROM THEIR ENEMY—HEAT

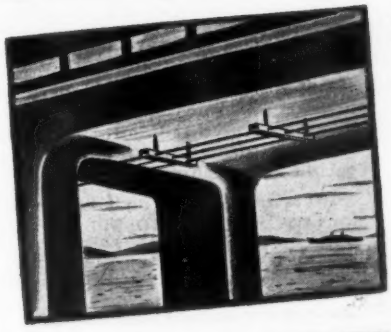
Heat is a serious threat to the long life and efficiency of electrical wires and cables, destroying covers and insulation on the reel and on the job. Yet a few simple precautions can go far to extend the life of the cable or wire. In operation, the more you reduce the temperature of the surrounding air, the longer insulation will last with the same conductor load. Or, if necessary, more current can be carried in the same cable without shortening its life. Here are some suggestions that will pay well:



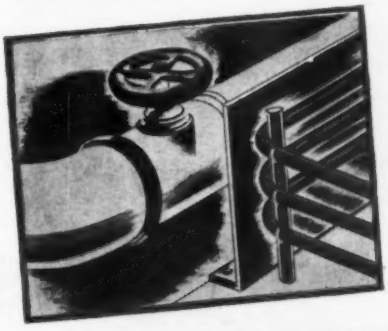
STORE CABLES IN A COOL — NOT COLD — PLACE. Stored in a cool, uniform temperature, cable insulation is maintained in the best condition for the longest possible life. Avoid extreme temperatures Keep cables under cover.



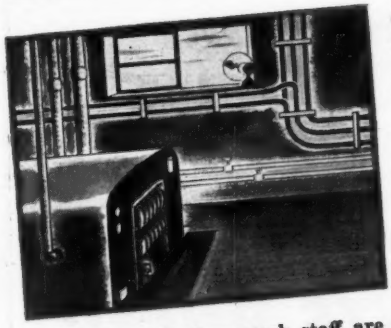
INSTALL RISER CABLES ON THE NORTH or most shaded side of poles — away from the heat of the sun.



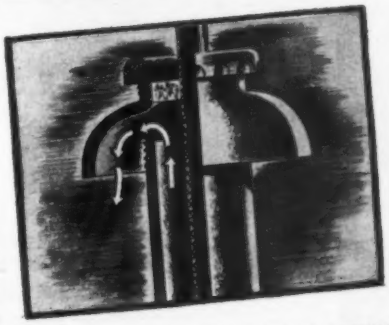
ON BRIDGES, VIADUCTS, ETC., PLACE CABLES BELOW THE STRUCTURE for protection from sun and weather. This also is more likely to add protection against accidental mechanical damage, vandalism and sabotage.



NEAR HEATING UNITS or hot pipes, move the wiring or insert baffles between the source of heat and the cables to deflect hot air.



IN HOT LOCATIONS—cut air vents in the ceiling or partition above cables to provide adequate circulation by means of natural convection or install fans.



VENTILATE POLE RISER CONDUITS and create circulation by making openings near the top or by leaving space between the conduit and pothead. This can improve the efficiency of an entire circuit.

Our engineers and research staff are anxious to help you prolong cable life. We will be glad to answer questions which may help you solve problems concerning protection and longer use of your electric wires and cables. No obligation is incurred by this service. The Okonite Company, Passaic, New Jersey.

OKONITE

Insulated Wires and Cables

3587

TRY TRANSITE

IF YOU'RE LOOKING FOR
THAT "SOMETHING EXTRA" IN

DUCTS

Check these features which are responsible for the reliable cableway service which Transite Ducts provide:

Inorganic . . . made of an asbestos and cement composition which provides permanence and strength, makes the ducts immune to rust or rot.

Permanently smooth bore . . . long cable pulls and replacements are made easier. Danger of damage to cables is minimized.

Easily and quickly installed . . . long, light-weight lengths and simple assembly method assure rapid, economical installation.

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Incombustible . . . won't contribute to the formation of dangerous smoke, gases, or fumes. If burnouts do occur these inorganic ducts provide maximum protection to adjacent cables and permit easy removal of damaged conductor.

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For exposed work and use underground without a concrete encasement.

TRANSITE *KORDUCT*

For installation in concrete. Thinner walled but otherwise identical with Transite Conduit.

JOHNS-MANVILLE *TRANSITE DUCTS*

JOHNS-MANVILLE JM PRODUCTS

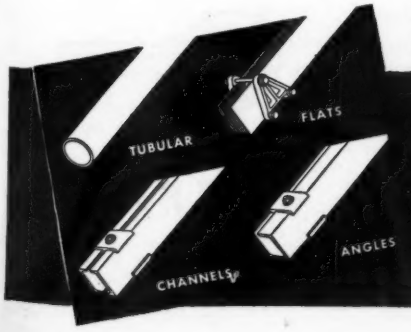
"SWINGING BUS" *proves highly satisfactory*

They're war workers, these Alcoa Aluminum buses, carrying power for vital production. Suspended from standard power-line insulators, with spans 24 feet rather than the usual 8 feet, costs were much lower than for rigid bus bar construction.

Buses are free to swing. The stiffness of the two Alcoa Aluminum channels comprising each conductor permits this long span design. The standard lengths supplied by Alcoa were welded at the joints to make each run a solid unit. The aluminum supplies the high electrical conductivity required.

Alcoa bus bars, Aluminum Cable Steel Reinforced, and fittings are available for essential work. If your power project has been approved, Alcoa can supply the necessary materials. With them, of course, goes the usual Alcoa engineering advisory service. ALUMINUM COMPANY OF AMERICA, 2164 Gulf Building, Pittsburgh 19, Pa.

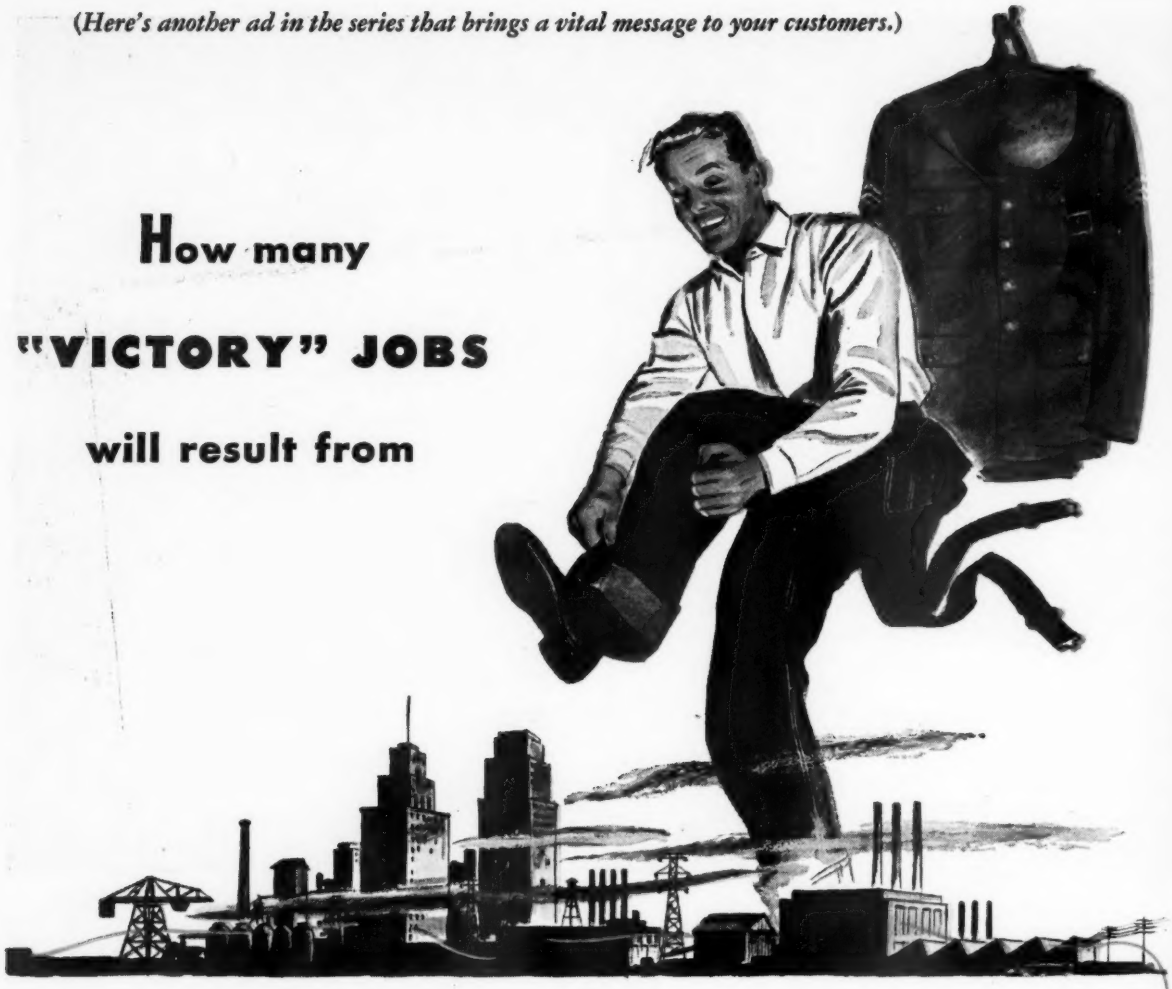
Note to manufacturers of electrical equipment: W.P.B. Order M-1-l now permits the use of aluminum for electrical conductors.



ALCOA
ALUMINUM

(Here's another ad in the series that brings a vital message to your customers.)

How many "VICTORY" JOBS will result from



increased use of *Electric Energy*

It's an exciting postwar picture any way you figure it. Expanded use of electricity is one of the brightest fields to count on for jobs for our returning service men.

Think of the employment that will result from electronics alone, which includes radio, television and countless industrial and home applications. Or consider air conditioning, heating, cooking, lighting, refrigeration. As new and finer electrical products are developed, employment all along the line will be created . . . within the electrical industry, and in every other industry.

But one thing is self-evident. Wiring will have to come first. Adequate wiring will be essential to full utilization of the electrical possibilities of the future. Now—in advance—is the time to plan for it. By all means, give it full weight in your postwar thinking.

Unwired planning will cost you a whole lot more than *planned wiring!*

AW ADEQUATE WIRING KEY TO VICTORY JOBS SERVES AND SAVES

HELP BRING VICTORY SOONER . . . BUY MORE WAR BONDS.

ANACONDA

ANACONDA WIRE & CABLE COMPANY

25 Broadway, New York 4 . . . Sales Offices in Principal Cities

Electrical Wires and Cables of Copper are the Life Lines of our Nation

ELECTRICAL SOUTH

VOL. 24 APRIL 1944 NO. 4

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CARL W. EVANS, *Editor*
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W. E. COOGLER, *Production Manager*

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Member A. B. P. — A. B. C.

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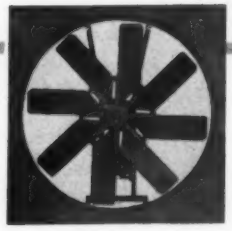
Coolair TRADE MARK



EXHAUST FANS and BLOWERS

DO YOU KNOW that the majority of your commercial and industrial prospects can now purchase COOLAIR Ventilating and Exhaust Fans and Blowers? Many active dealers and distributors have been soliciting *and* selling orders for summer business for the past several months.

HERE ARE 4 REASONS

. . . why you should contact all of your prospects now:

1. CMP Regulation 5 permits almost any type of business, able to certify that the equipment they order is necessary to the successful operation of their business, to assign their own preference ratings on purchases up to $500 in value. Form PD-1 A can be filed for orders in excess of $500.

2. Many Army and Navy orders are still available to wide-awake dealers who keep in touch with these prospects.

3. Even though your prospect may not actually need Coolair Fans for 60-90 days or longer, his order should be placed now to insure delivery for this summer's use.

4. Wartime shortages of manpower and materials are a constant threat to production schedules. Plan ahead and act NOW!

BEGIN TODAY... contacting your prospects at once and let us know if you need additional information. Send for a supply of Coolair literature and the 1944 price list.

A full description of the Coolair line, with tables showing models, dimensions, performance data, etc., can be found in
SWEET'S CATALOG A.S.H.V.E. GUIDE
ELECTRICAL BUYER'S REFERENCE

AMERICAN COOLAIR CORPORATION...Manufacturers
3604 MAYFLOWER STREET
JACKSONVILLE 3, FLORIDA

Designed for SAFETY

in dust-laden atmospheres

Carbon black, coal dust, coke dust and grain dust are hazards. To guard against dust explosions which may be set off by exposed arcs,

This Power Plant of a large New England utility company (not identified for obvious reasons) is equipped with (FA) Dust-tight Circuit Breaker Panelboards in all hazardous locations.

At left: Lighting Standard type (FA) Dust-tight Panelboard and Cabinet for wall or exposed column mounting. (12" or 15" wide, as required.)

DUST-TIGHT Light and Power PANELBOARDS

were expressly designed. They are proving vital protection in shell-loading plants, coal mines, coal processing plants, grain mills and other places where dust is dangerous. They are approved by Underwriters' Laboratories, Inc., for "Class II, Groups F and G, Hazardous Locations."

Instead of the usual steel front with door, these panelboards have a solid steel front plate, gasketed all 'round and secured with screws to the extra wide box flange. They are further rendered dust-tight with welded hubs for conduit outlets, welded box-corners, and handle bushings riveted directly to the steel cover plate. External mounting brackets are provided to maintain the dust-tight construction.

The circuits are externally operable by a mechanism of new (FA) design. The handles operate through dust-tight bushings, and engage the regular handles of the circuit breakers inside the cabinet. ON and OFF positions are indicated on the front of the cabinet.

The (FA) Dust-tight Panelboard may be had in standard type or in narrow column type. It is of the circuit breaker type, with either (FA) Type AC or (FA) Dublbrak circuit breakers (or other types of lighting branch-circuit circuit breakers) . . . Capacities: Lighting Panels — 50 amperes or less, for 3 wire, single phase, or 4 wire, 3 phase mains, with lugs only or main breaker. Available with 4 to 42 circuits. Power Panels—50 to 600 amperes, 250 volts AC or DC, and 600 volts AC . . . Frank Adam Electric Company, Box 357, St. Louis, Mo.

EST. 1891 — THE SIGN OF A BETTER JOB

Frank Adam

ELECTRICAL PRODUCTS

FRANK ADAM ELECTRIC CO. ST. LOUIS, MO. U.S.A.

The Electrical Job In the Postwar Home

By A. E. Schanuel*

THE time has come, the recently announced Baruch program asserts, to organize for action on postwar problems, for the solution of these is "second only to the winning of the war."

The big job, the absolutely assured job—postwar—will be the building of millions of new homes. It really doesn't matter whether you dream up totals on your own adding machine, or cast your vote for any one of a dozen qualified national estimates. The homes will be built, and building will begin the day construction materials are released for that purpose. Thousands of jobs will be created.

Electrical men have right now, *today*, a real interest in and responsibility toward the coming building program. It is almost a blueprint sort of interest because the electrical industry is also the important electrical branch of the construction industry.

The electrical job will be a major operation in postwar home building.

That is a fact, not an assumption or a selling slant, and it will be more easily demonstrable postwar than it was three or four years ago.

In its simpliest terms the problem is this. Builders will try to meet the demands of the first wave of postwar home buyers, thousands upon thousands of prospects who probably will rush into the market all worked up with the "gimmies" subtly rooted in their minds by eye-filling pencil-planning. These families will have war bonds in their pockets and be on the lookout for convenient barrel heads.

Builders realize that the "ideas" of customers will have little possibility of realization in the first houses to be built or modernized. The fact that many of the "pencil-planners" feature home equipment that will have to be operated electrically is not the entire problem but it is very significant.

One other fact is crystal clear. Electrical construction materials will be available immediately. No reconversion is needed in this field of manufacture.

But home building is a composite job. The builder has to control and direct the services of approximately fourteen highly specialized operations by as many independent or sub-contractor specialists; also the services of about ten specialized suppliers.

From the viewpoint of the builder's operation the electrical job is an incidental one. In relation to sales price of the house it may represent on the average cost as much as 3 per cent.

How then can the building industry provide its buyers with postwar homes that will be truly *postwar* even if the new electrical equipment has not yet become available? How can such homes be built to provide for the additional and new elements of electronics, infra-red, ultra-violet and fluorescent lighting, to say nothing of other features that will be on practically every "want list"—kitchen equipment, laundry, heating, air conditioning, light conditioning, etc.?

This one question gives the entire building fraternity a "must" cue on what may well be its most basic problem.

The full electrical job in postwar homes—the wanted job—can only be assured through complete adequacy of the electrical wiring installed in the floors, walls and ceilings at the time the homes are built.

The new key emblem of the national adequate wiring program was skilfully employed in this attractive window display of the Electric Power Board of Chattanooga, featuring the postwar home.

*Mr. Schanuel is field representative, National Adequate Wiring Bureau, of New York, New York.

Roy A. Palmer conferring with A. E. Schanuel at the time of the first meeting of the North Carolina Electrical Industry Postwar Planning Committee. Electrical men in Charlotte were among the first in prewar years to develop a broad program of cooperation with the building industry on adequate wiring.

It is the job of the electrical industry — right now — to help the building fraternity meet a coming situation in which both industries have a mutually helpful interest, to say nothing of the legitimate requirements of prospective home buyers and home financing agencies.

The electrical industry has a program. It is stated, in essence, and as a basic theme of service to the building fraternity in the National Adequate Wiring Bureau's new key emblem and slogan — "Adequate Wiring — The Key to the Home of Tomorrow."

It will be our job to work with the building industry in its postwar planning, to show that the electrical job will be a major operation, to help builders, *now*, so that, when construction is resumed, they can say to their prospects—"this is a postwar home, electrically."

This initial and fundamental step of adequate wiring may be the building fraternity's *only means* of proving that proper provisions for postwar electrical operations have been made in the first new homes.

All of us in the electrical industry must realize that when we characterize the electrical job in postwar home building as a major operation we are really talking about something big. Because tomorrow's action will be on an unprecedented scale, today's planning must be geared to move right into the picture and build constructively from there on out.

It is because something new has been added that this industry of ours has before it an immediate opportunity and responsibility to the building industry. Futures, electrical futures that we will build and serve with electrical power, futures that some day will be plug-in operating realities — these reveal the greater measure of our mutual problem.

Of all groups related to the building industry, ours is the only one whose business it is to manufacture hundreds of products for daily home use, to give twenty-four hour electrical service. Our relation with the public is a continuing life-time relation.

Because of its unusually successful operation of many A.W. certification programs, pre-war, the electrical industry in the Southern area has the "know-how" and will have everything that it takes to present the story to the electrical job as a major operation in postwar home building and, subsequently, to work, as it has done in the past, with builders, architects, lending agencies and prospective buyers.

Pre-war wiring activities in the South centered on certification, in approximately twenty cities, and ran the gamut from the industry's regional wiring conference in New Orleans to local promotions that employed radio, newspaper advertising, direct mail, exhibits and window displays (among them some voltage drop demonstrators that really demonstrated) wiring layout service, consumer meetings, model demonstration homes, talks before builders, architects and lending agency officials. In fact there was no single phase of wiring promotion that was not successfully used somewhere in the South in the pre-war years when adequate wiring was meeting with increasing acceptance by American families and the entire building fraternity.

At that time certification programs were being conducted by electrical industry groups in Alexandria, Charleston (W. Va.), Richmond, Roanoke, Norfolk, Charlotte, Raleigh, Chattanooga, Memphis, Lexington, Birmingham, Atlanta, Jacksonville, Charleston (S. C.), Dallas, San Antonio and New Orleans.

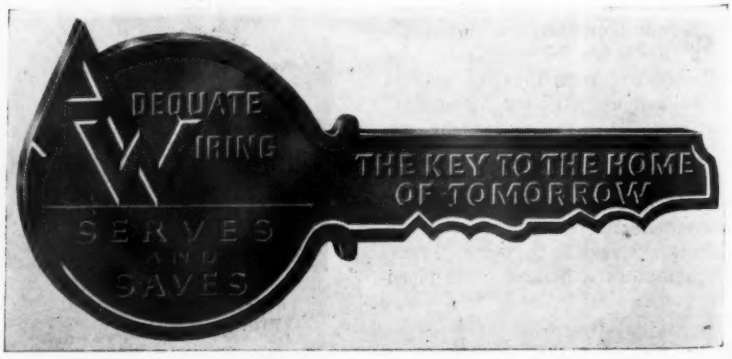
Electrical men from 10 Southern States came to the New Orleans regional conference held in December 1939, and heard reports on a score of A. W. programs, including the Dallas activity where the greatest single factor contributing to A. W. promotion in new homes was the recognition of this feature by the local F. H. A. office in its loan appraisals.

In Chattanooga, the league there certified the wiring in more than 800 new homes in a fairly short pre-war period.

Another outstanding example of all-out industry efforts on behalf of adequacy of wiring in new homes was that of the Georgia A. W. Bureau whose 45,000 square mile territory coincided wtih that of the Georgia Power Company.

In San Antonio, Edward A. Gauthier, sales promotion manager, San Antonio Public Service Co., produced one of the country's most arresting and effective displays which flashed to audiences a dramatic picture in color of the difference between an adequate and an inadequate installation.

Space would not permit the recounting of a tenth of the Southern industry's work in promoting adequate wiring. Some idea of the scope and great variety of this work may be had by reference to the March 1939 issue of ELECTRICAL SOUTH in which many A. W. programs then active were summarized. *(Continued on page 66)*



The National Adequate Wiring Program's key emblem and slogan.

Electrical Living in 194?

An expert on home design presents a preview of the postwar home's electrical load and the wiring required to serve it.

By I. W. Clark*

THE NEED for one million housing units or more annually in this country of ours, for a period of at least ten years, is well established. This is necessary to keep American housing standards on a basis with the balance of our living economy. Annual net family increases—replacements of units destroyed by catastrophe—or demolished as sub-standard or for commercial expansion require about 900,000 new units annually, while for the past ten years our building rate has been at the yearly average of only 350,000 units. This has created a huge backlog.

Need, however, is one thing. Converting this need into actual

*Mr. Clark is manager, Better Homes Department, Westinghouse Electric and Manufacturing Company, Pittsburgh, Pennsylvania.

Fig. 1-A—This typical single story and basement home in $6,000 class is wired for future probable loads. The floor plan includes adequate outlets, correctly segregated circuits, and proper circuit protection. Fig. 1-B—The house has five major electric circuits: master supply circuit, kitchen and laundry, utility room, living room and dining space, and bedroom and bath. The four distribution centers are located near respective load centers.

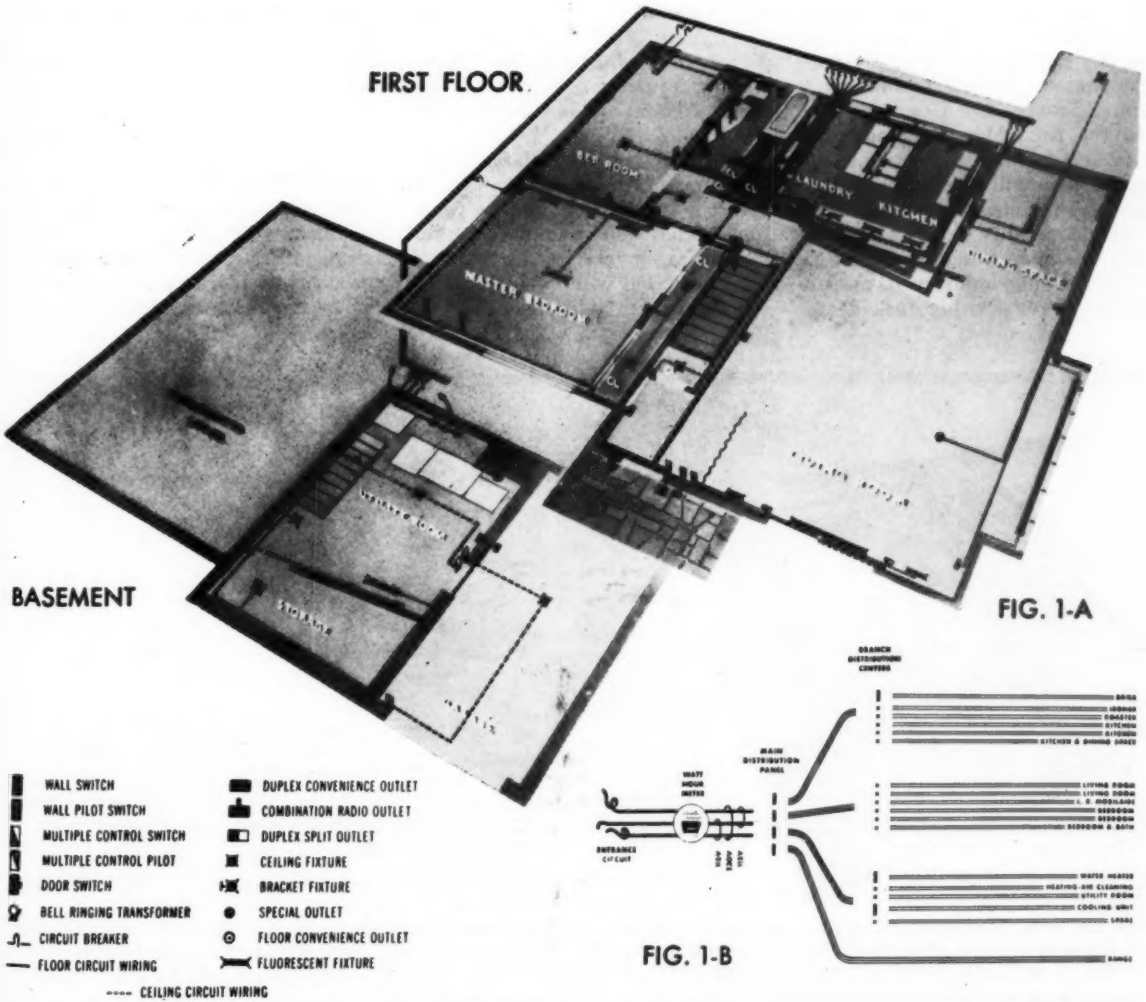


FIG. 1-A

FIG. 1-B

houses is quite another. It will require the concerted effort of the entire housing industry to produce a better package—a better living unit—in order for this need to appeal to the consumer on a sufficiently strong basis to compete against the automobile, the delayed vacation, fur coats, jewelry, and a thousand other consumer items which will be strenuously fighting for a share of the surplus consumer dollars that will exist at the end of the war period.

To evaluate properly the probable actual housing construction, however, certain premises must be established:

(1) That the peak post-war year will probably be 30 per cent above production in 1940.

(2) That all monetary value references are based on 1940 dollars.

(3) The starting point for housing construction projections will be the end of the war with both Germany and Japan. While there will, undoubtedly, be some relaxation of present housing restrictions, possibly before the end of the German phase of the war, and very certainly, between the German phase and the final blow to Japan, the number of units that will be so constructed will be comparatively small. The importance of the units built during this iterim will lie in the stimulation which they will give to the housing industry in preparing itself for the big task of re-housing America, after the war is finally won.

First Five Year Housing Projection

A careful check of data compiled by the country's leading authorities indicates that one should expect housing construction to develop on the following approximate schedule:

First year—350,000 to 400,000 units
Second year—500,000 to 600,000 unit
Third year—700,000 to 800,000 units
Fourth year—900,000 units
Fifth year—1,000,000 units or more

These figures are reasonable and within the ability of the housing industry to accomplish and the public to absorb.

New housing, however, is only a part of the story. When the war is over, fifteen years will have elapsed since there has been any important amount of modernization or repair. A crying need for fundamental repairs and a tremendous demand for modernization of our present housing structures have existed for many years. During the transition period from war to peace, repair and modernization should be the major factors in our housing efforts.

With proper stimulation, the number of dollars which will be spent in the first one or two years immediately following the war for modernization and repair will not only equal, but will probably exceed by from twenty-five per cent to fifty per cent, the number of dollars spent on new housing construction.

New housing construction of the magnitude just projected will require large volumes of permanent public works, such as streets, sewers, water systems, sewerage disposal plants, play-grounds, schools, commercial and public buildings. This volume is estimated to be at least equal to the number of dollars invested in new housing. A great deal of this "heavy construction" should take place in advance of actual housing operations.

The actual potential of the three phases of the total housing market: (1) the new; (2) the modernization; and (3) the permanent public works and commercial buildings, represent a major opportunity for the electrical industry. It will be the first peak housing cycle in which electricity has played an important part.

The success of our participation in postwar housing, in fact in all electrical merchandising, will depend upon just how well we promote our wares—upon our close cooperation with the housing industry—upon how well we do our jobs.

The Electrical Home of Tomorrow

All signposts indicate that all new homes of 194X will be electrical. Strong indications point toward a greater use of electricity in existing homes. Both of these

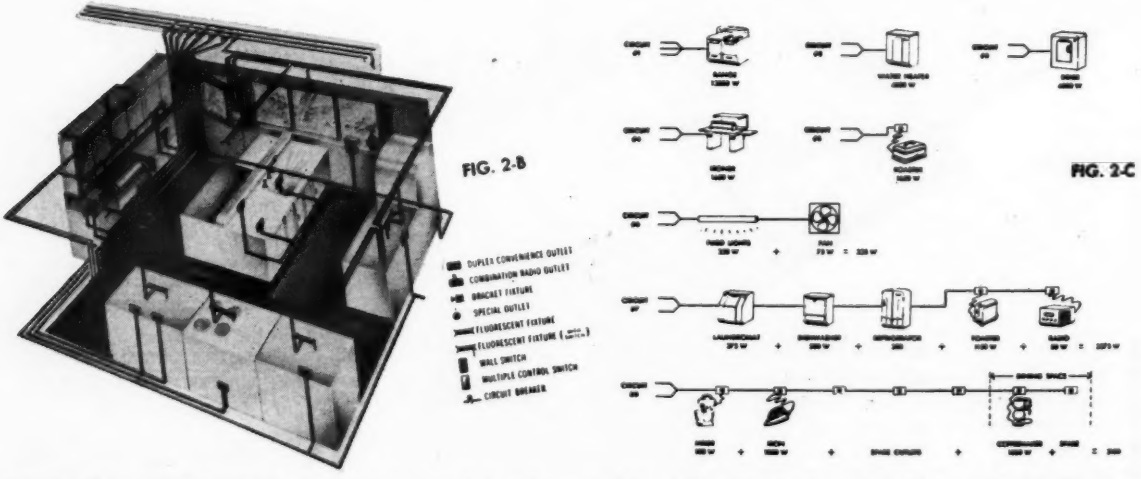


Fig. 2—This completely electrified kitchen and laundry is designed to save time and labor. The correct way of wiring to serve the variety of electrical appliances is to provide eight individual circuits. Lights will not dim and kitchen and laundry equipment will operate at peak efficiency even when all appliances are used simultaneously.

factors are based upon the following points:

(1) Electrical energy has been a major factor in the vast and amazing production of war goods and materials. Its production has been greatly expanded. As we turn from war to peace, vast amounts of energy will be available to play a major part in raising the standards of American living.

(2) Never in history has man had as flexible a source of power and energy as that of electricity.

(3) The history of rate structures over the past two decades has been one of greater service and lower cost to the ultimate consumer. Electrical power is the least expensive of all "essential household services".

Yes, the home, either new or modernized of the late 40's and 50's can be completely electrical.

10,000 Kwh Consumption

It is estimated after careful study that the average housing unit of 194X will have an annual electrical consumption potential of 10,000 kilowatt hours. This is not a guess, but is based upon sound facts. Think of it! In the short space of twenty-odd years the use of electricity in the home has grown from a few lamp bulbs, a fan, an iron, an occasional range and a toaster to approximately forty different items to bring new comfort, new convenience and better living to the American public.

For many years, complete electric kitchens have been promoted. This promotion has been a success. Thousands of complete installations are now in use to the gratification of their owners.

The technique of using a complete room with the electrical installations in their proper setting—a part of the whole room, with all of its beauty, its comfort, its convenience effectively displayed and known as *ensemble selling* is adaptable not only to the kitchen, but to the laundry, the utility room, yes, even to living rooms, bedrooms and baths. In fact, ensemble promotions will apply to the entire home—the complete living unit in 194X.

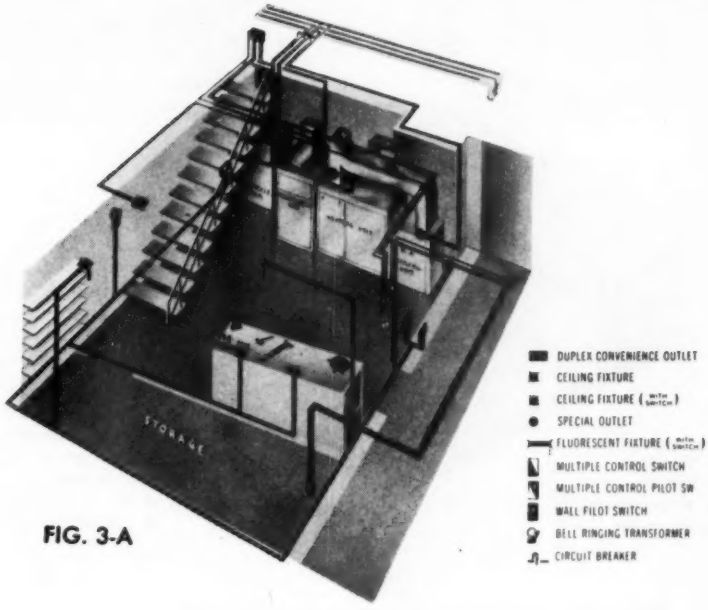


FIG. 3-A

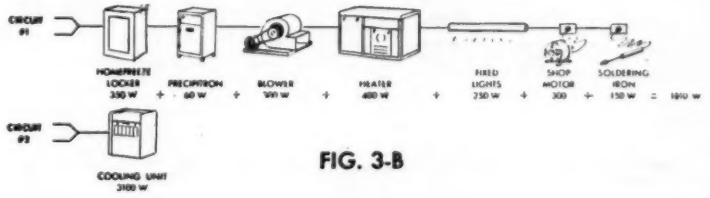


FIG. 3-B

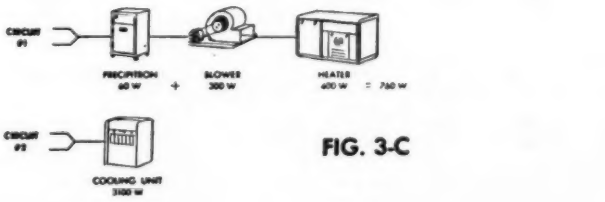


FIG. 3-C

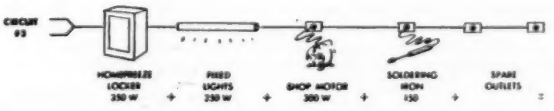


Fig. 3—The utility room needs 3 circuits to provide power for the automatic heating unit, Precipitron air cleaner, homefreeze locker, air conditioner, lighting and other appliances. Fig. 3-B illustrates the fact that two circuits will not carry this load with complete protection to the equipment. Fig. 3-C shows proper distribution of load over three circuits.

The complete kitchen has in the past been considered to consist of a range and refrigerator, with possibly a dishwasher and disposal unit. Too little emphasis has been placed upon the better location and greater use of the roaster, coffee maker, toaster, electric mixer, waffle maker, kitchen ventilating fan, and the radio.

Too often the laundry is thought of in terms of washing machine and hand iron load. The modern laundry in the home of tomorrow will consist of an automatic cycle washer, a drier, an ironer, and a water heater, for a total average consumption of 3800 kilowatt-hours annually. The value of the complete laundry as a consumer of kilowatt hours, coupled with maximum satisfaction to its owners, cannot be over-emphasized.

Again, the advent of the Precipi-

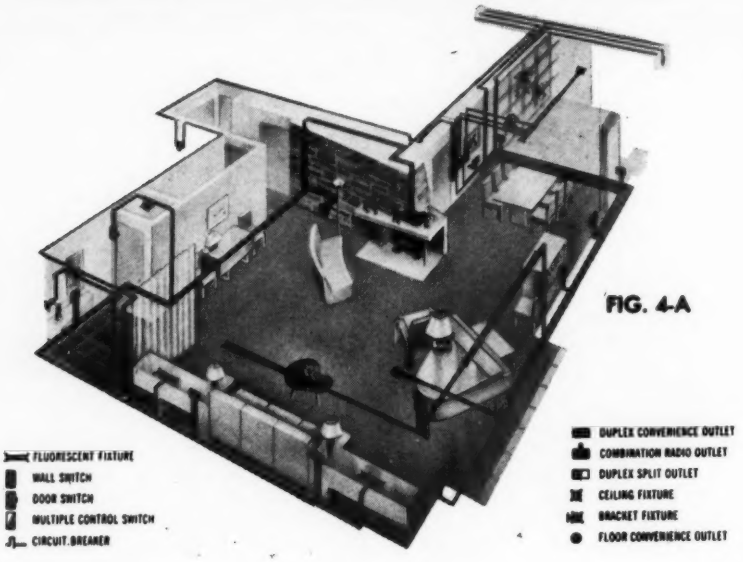


FIG. 4-A

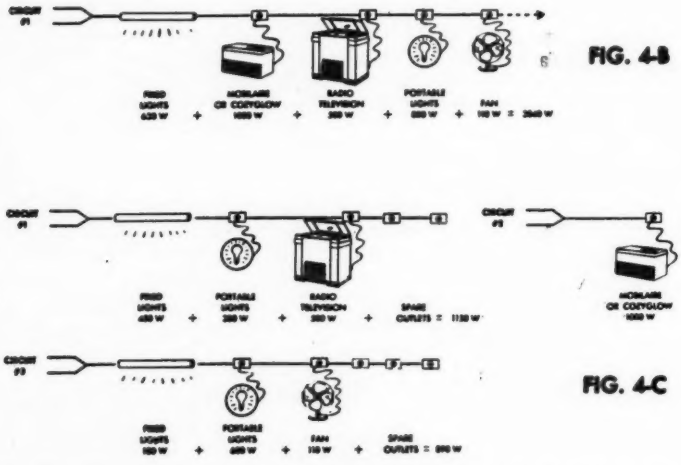


FIG. 4-B

FIG. 4-C

Fig. 4—For this typical living room and dining space a single stringy circuit such as shown in Fig. 4-B is not satisfactory. Fig. 4-C shows the ideal arrangement using three circuits. Lighting is distributed over two separate circuits with shorter runs. One circuit has spare capacity for a television set while the other cares for cozy-glow on chilly days and air conditioner in summer. Cooking appliances use heavy duty circuit from kitchen.

tron, as a practical home device that assures an air supply free from dust and with low bacteria count—and the home freeze locker—when added to the heating and cooling system, bring to the utility room an attractive total load of 2700 kilowatt hours.

194X Products Will Come

When the war is over, the crucial problem of all industry will be one of re-conversion with minimum unemployment. This means that the manufacturer must get back into the production of the things that he was making when the clouds of war descended. The tools, the techniques, the materials, the production lines can be more easily converted to 1942 products than to wait for new tools, new techniques, new materials that entirely new products would require. It is, therefore, only sound, sensible thinking to anticipate that the equipment and materials will be the same or similar to those with which we built in 1942. To be sure, these may carry a new dress, but fundamentally, 1942 products should be anticipated for the immediate postwar period.

Many of the elements and materials and products which we have seen displayed across the pages of our forward thinking publications and have heard expounded from the stage and press, as "Items of Tomorrow" will eventually become a fact. Product and design history, however, has been one of organized improvement year after year, through research and development step by step.

New materials require new techniques, new machinery, reasonable periods of testing before the reputable manufacturer is prepared to place them on the market for consumer use, and this evolutionary process applies to housing as well. You may be sure, however, that the period immediately following the war will be one of greatly accelerated development of all products and materials—both old and new.

Wiring Is Bottleneck

A long and careful study has revealed a serious and major bottleneck to future home load building programs. House wiring has not kept pace with increased appliance use, nor with the increased wattages as applied to individual units as:

Original Wattage

Toaster	**500 watts or less**
Hand Irons	**500 watts**
Roasters	**1000 watts**
Lamp bulbs	**40 to 75 watts**

Wattage in 1942

Toaster	**1000 watts**
Hand Irons	**1000 watts**
Roasters	**1300 - 1400 watts**
Lamp bulbs	**60 to 300 watts**

Wiring in more than ninety-five per cent of America's homes is inadequate to carry efficiently the present lighting and appliance loads. Corrective action is a *must* in both new and old homes.

The penalty that is placed upon the sale of some major appliances as the range, water heater, and the drier, because of inadequate wiring, has greatly retarded the use of these important units in many areas. It has deprived thousands of home owners, who can use appliances of this nature, of the convenience that they can bring to them.

A study of service problems indicates clearly that far too high a

(Continued on page 63)

Contractors Seek Service Work As Construction Decreases

By P. R. Russell

STANSELL Electric Company, of Nashville, Tennessee, operated by James N. Stansell, is probably typical in views and in experience of electric contractors in the South, as well as in the area in which he conducts his business. What of the past year and what of the prospects for the coming year?

Mr. Stansell represented the Nashville Chapter of the National Electrical Contractors Association at the national convention in Chicago recently and there he was informed that there is in prospect, under federal restraint and regulation, a mere $3,500,000,000 worth of work to be done in 1944 in comparison with about $7,500,000,000 done in 1943. This greater than fifty per cent cut can mean an even deeper reduction in proportion in electrical work if a type of construction using less wiring predominates in the range of work allowed.

"I am planning to go in for an increased amount of repair work," asserted Mr. Stansell to the writer, continuing: "If I can get enough repair work to meet the payroll and take care of the overhead, I won't need to worry about the probable decrease and fluctuation in the contract work. Most of the repair work we will do will be on home appliances — electric refrigerators, ranges, hot water heaters. Each type of work will be taken care of by a department, headed by an electrician experienced in that line and with the best helpers we can give him."

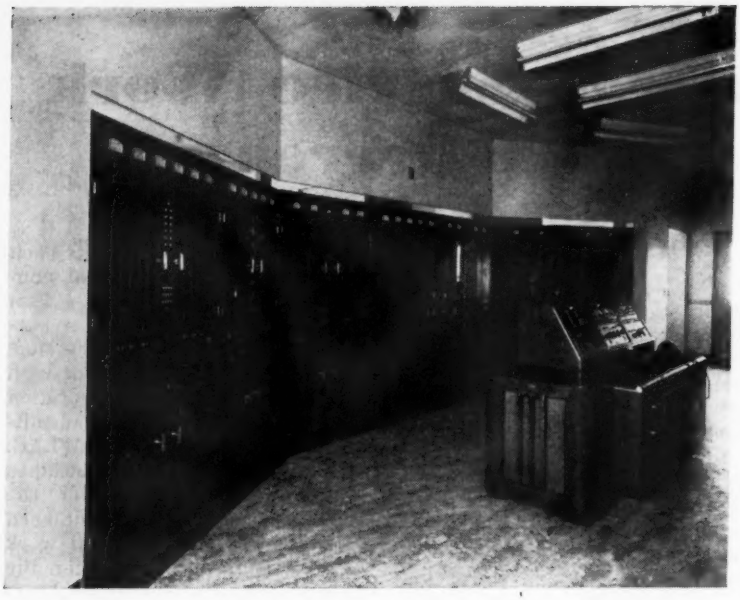
Mr. Stansell's plans for doing an increased amount of repair work on electric appliances in the home seems well-founded. The writer was informed in an interview with John R. Cherry, sales promotion manager for Nashville Electric Service, the city's public utility, that there are approximately 34,000 electric refrigerators, 23,000 electric ranges, and 8,500 electric hot water heaters in the immediate Nashville territory and that these appliances now average five years old, which means an increasing demand for repair service. Mr. Cherry does not expect any considerable replacement of these appliances in less than fifteen to eighteen months after the end of the war.

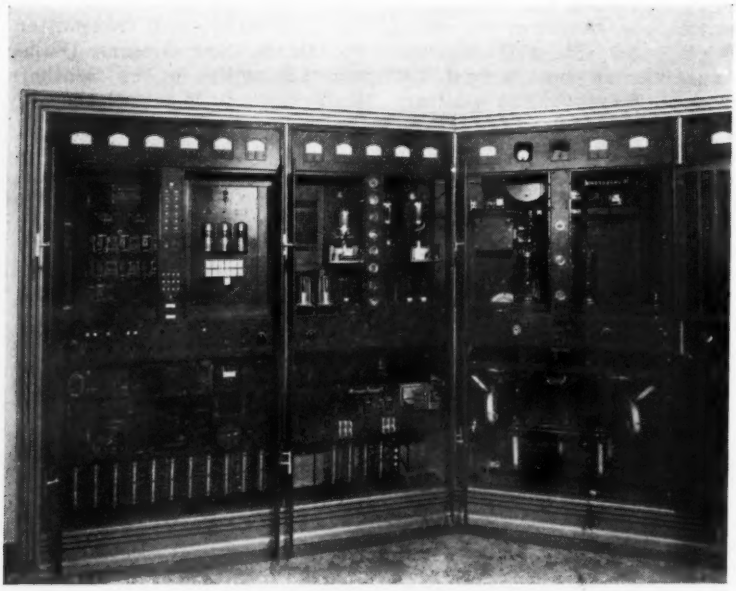
Mr. Stansell's idea that he can greatly increase his home appliance repair business appears sound from another angle. In normal times the city utility, operating the light and power system, does about 45 per cent of the appliance repair work (according to Mr. Cherry), but is now doing 80 to 90 per cent of it, due to the fact that electrical contractors have been too busy on war plant wiring to bother with it. To get their share of this repair business back away from the city utility is the task faced in coming months by the dozen or so electrical contractors of Nashville.

Right now Stansell Electric Company is engaged almost 100 per cent in war plant contract work, but Mr. Stansell looks back with satisfaction on several non-military jobs done by his firm within recent months. He is particularly proud of being the electrical contractor entrusted with the job of making the installation of the new 50,000-watt transmitter for Radio Station WLAC, which went on the broadcast lanes a few months back, after the various contractors had finished their work. The electrical work on this job was done after the federal shut-down on critical materials, but the owners of WLAC, under the supervision of Chief Engineer David Binns, had the needed materials already on hand and were allowed to complete the new transmitter without interference from the War Production Board.

Nashville has another 50,000-watt radio station — WSM — and there are 50,000-watt transmitters in Atlanta, New Orleans, Dallas, and Louisville in the Southern states, but such installations by

An interesting installation completed by Stansell Electric Company just as construction materials were frozen was the 50,000 watt transmitter of Radio Station WSM, in Nashville. Shown here is transformer room.





These photos show additional views of equipment installed by Stansell Electric Company for Radio Station WSM, of Nashville, for the station's new 50,000 watt transmitter. Above, the transmitter room and control desk; below, transmitter cabinets with covers removed. An interesting feature of the new transmitter is the ground assembly which consists of 75,000 feet of No. 10 bare copper wire buried under the ground in an area of nearly thirteen acres. Although construction materials were frozen before this installation was made, the owners were allowed to complete it because they had materials on hand.

an electrical contractor are very rare indeed. Chief Engineer Binns cites, as a fact of interest to electrical contractors, that the "ground" assembly for the WLAC transmitter consists of 75,000 feet of No. 10 bare copper wire which lies under nearly thirteen acres of ground.

Mr. Stansell, whose contract for labor and the small amount of material he was required to furnish amounted to $12,000 on a cost-plus basis, stated that the most difficult problem encountered on this job was the lighting of the three transmitter towers—one 368 feet high and the other two 165 feet high. The wire to the light installations on the towers and at the very top had to be carried up through small access holes through the plate at each section of the structures. This wiring, of course, had to be insulated from the towers and from the ground. This was the only part of the job, according to Mr. Stansell, that didn't go off in the time and with the effort calculated necessary for it.

The accompanying photos will reveal, to the electrician, much of the work necessary on the WLAC installation. Two of the pictures show the 50,000-watt transmitter—one with the cabinet doors closed and the other with the doors open. The third picture shows the power transformer units necessary for the transmitter. This third picture also reveals some of the overhead conduit work required to complete the installation. Mr. Binns expressed to the writer the appreciation of the owners of WLAC and of himself for the good work done by Stansell Electric Company on this job.

Mr. Stansell foresees a great amount of commercial electric wiring for electric contractors as soon as federal restrictions on materials are lifted. He stated that there are hundreds of business firms in Nashville that will want to remodel, and many rebuild, as soon as possible—and they have the cash ready to pay for it.

Stansell Electric Company, according to its proprietor, gets nearly all of its information on contract work from the office of R. Lynn Farrar, secretary of the Nashville Chapter of NECA, and that the very vital information about federal priorities regulations affecting his business as an electrical contractor comes almost altogether from the same source.

Certainly of interest to electricians is the fact that there are now 524,000 consumers of electric current in the area served with electric power by the Tennessee Valley Authority, an increase of 33,000 over the previous year and that the number of kilowatt hours sold in the 1943 fiscal year was 2,738,000,000, an increase of 300,000,000 over the previous year, according to a statement issued by TVA authorities.

Dealer Problems in Mobile Where Population Tripled

By Geo. H. Watson

SALESMANSHIP in reverse—that is the story of electric appliance sales and service in the crowded war center of Mobile, Ala., as pictured by Chick McDavid, president of the McDavid Supply Company, of that city.

"Largely by virtue of being a shipbuilding city, the population of Mobile has increased in two or three years from 78,000 to 210,000," said Mr. McDavid. "People have come here from everywhere and especially from surrounding farms and villages. The demand from them for electric appliances has been insatiable. They have bought everything new that was available and all the reconditioned merchandise we could supply, and we have scoured the country for it.

"Under such conditions it is easy to see that salesmanship as we once knew it was out the window. To have the merchandise was to sell it. We had to put the brakes on, in fact. We were frank to tell our customers that some of the merchandise offered was of the victory type at twice the price and not half as good as we once offered.

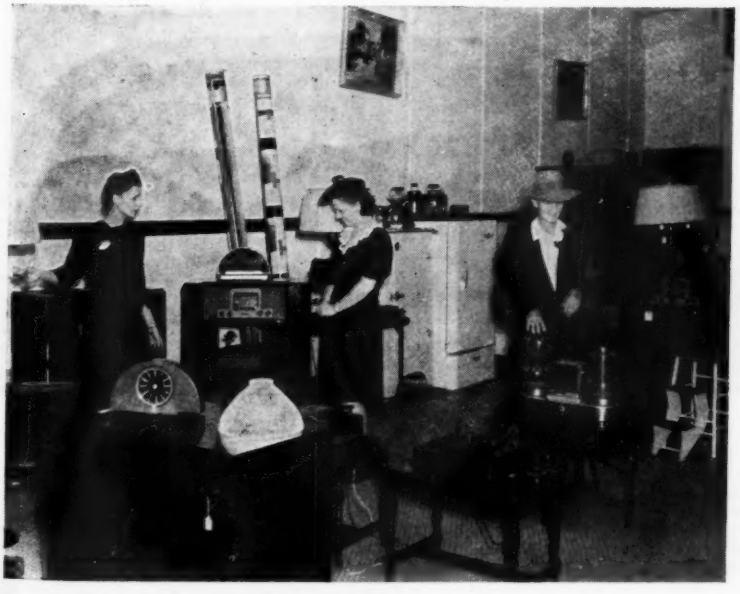
"Many of the folks coming here lived, temporarily at least, in trailers, tents or under other crowded conditions. So they wanted items that they could get along with in cramped quarters, such as electric coffee makers, hot plates, midget radios, etc. We did, and are doing, our best to supply them.

"But in selling a hot plate, for instance, we instructed our sales force to give the lowdown on the merchandise, to go 'in reverse' if you please. We would say, 'Now mister, this hot plate is a Victory model. It is all right to make coffee on it, but it won't stand up to a lot of heavy cooking and it will be too bad if you spill water on it.' Usually the customer goes ahead and buys the appliance anyhow, as he has the money and the need for it. We tell him if it does burn out we will rewire it for him if we have the wire, but we may not have the wire.

"We have sold thousands of reconditioned appliances, especially wanted items like pressing irons, heaters, fans, toasters as well as some major appliances. We couldn't guarantee them for any period of time on account of the conditions under which they were assembled, repaired and then used. But we did tell customers that if the appliance didn't work on getting home to bring it back and we would try to fix it.

"With such a demand, and with limited merchandise to supply it, it is easy to see that no salesmanship is needed. If you put up a sign 'only one to a customer' you start another line. So the result is that we have all become punk salesmen. I don't know what effect that will have on us after the war, but we do have a reputation to uphold. We did not want customers to expect a lot from the merchandise we are now handling and then be disappointed with it. Therefore, we have warned them in advance. We have had more customers than we could serve anyhow, and it seemed to reach the point that the more you knocked an appliance the more the customer wanted it."

(*Continued on page 62*)



McDAVID SPECIALS
Read 'Em Over Carefully
Ironing Cards and Ironing Boards
Small Midget Electric Water Heaters
Electric Waffle Irons, single and double
Beautiful Spring-Wind Clocks
Automatic Electric Record Players
Large Radio-Phonograph Combinations
Chromium Electric Steak Broilers
Children's Rocking Chairs and Toys
Large Fluorescent Desk Lights
Batteries for Portable Radios
All-Metal Tool Boxes
Most of the above items are rather scarce, so if you are going to need any of this type of merchandise, it will pay you to act quickly.
WE REPAIR ELECTRIC IRONS
Come to See Us
McDAVID
SUPPLY CO.
42 NORTH ROYAL
2-8814
Next to Western Union

At left, part of the McDavid show room in Mobile, Alabama. By keeping on the alert for all old appliances that might be purchased and reconditioned, the firm has managed to meet some of the needs of the people of Mobile. Ship-building activities have resulted in a population growth of nearly 300 per cent in two years. Above, typical advertisement of the McDavid Supply Company.

Locker Plants, Home Service -- Subject of Georgia Meetings

By Donald Moore

TO TRAIN its engineers and agricultural representatives, as well as those of the state agricultural extension service, experiment station, and department of education, for assisting in the planning, selection and operation of freezer locker plants in Georgia, the Georgia Power Company recently held an intensive two-day school in Atlanta.

More than 60 persons attended the two-day session to arm themselves with up-to-date information concerning the application for priorities to build freezer locker plants, and the engineering and operation of such plants as successful modern food-processing factories.

Highlight of the meeting was distribution of a new 92-page manual compiled by the Commercial Customer Service Division of the Georgia Power Company, entitled "How to Select and Operate a Freezer Locker Plant Successfully." The manual, profusely illustrated with photographs of Georgia plants and charts, will be distributed to vocational agriculture teachers, county agents, and chairmen of community groups endeavoring to obtain freezer locker plants, as well as to the rural engineers and managers of the power company.

Many of those attending the freezer-locker plant school were surprised to hear, and later read in the manual, that only 26 freezer-locker plants had been placed in operation in Georgia but that 29 were planned for construction under priority approval by the War Food Administration and the War Production Board.

WFA requirements and WPB regulations controlling the construction and operation of freezer locker plants were covered at the beginning of the school by local officials of these agencies. T. R. Breedlove, administrative officer in charge of the Agricultural Adjustment Agency in Georgia, outlined the WFA rules, while Noon B. Hudson, state manager of the WPB's priorities division, explained the WPB regulations. Mr. Hudson praised the digest of the requirements that appears in the new freezer-locker plant manual, as well as its inclusion of the complete government orders on freezer-locker plants.

L. W. Gray, rural service manager of the power company, stressed the importance of a full complement of meat-processing facilities in projected freezer-locker plants in Georgia. He pointed out how Southerners prefer cured pork, especially hams and bacon, and the consequent need for plenty of salt-curing room and a smoking chamber in the freezer-locker plant.

Attention was brought by R. L. Brooks, chairman of the school and commercial customer service supervisor of the power company, to the fact that "existing plants show a need in Georgia of a minimum of one salt-curing bin to every two lockers." He also pointed out the WFA requirement of "not less that .6 square feet of chilling and aging room per locker, except where fruits and vegetables constitute a major portion of the product to be stored."

The financing of freezer-locker plants was discussed by W. A. Tadlock, manager of Jordan-Tadlock Company, Inc., new Atlanta

(*Continued on page 18*)

(Left) J. G. Woodroof, of the Georgia Experiment Station, points to a map of Georgia showing existing and proposed freezer locker plants in the state. Looking on, left to right, are Mrs. Christine Ballard, Georgia Power Company home economist, R. L. Brooks, commercial customer service supervisor of the power company, and Hoyt Turner, professor of food processing at the University of Georgia. (Right) A group in attendance at the freezer locker school look over a copy of the power company's practical manual on "How to Select and Operate a Freezer Locker Plant Successfully." Left to right are C. P. Goree, Atlanta district manager of the Frick Company; T. G. Walters, supervisor of agricultural education, Georgia Dept. of Education; Mr. Brooks, who prepared the manual, and Miss Ida Atkinson, of the Georgia Experiment Station, Griffin.

(Left) During the Southeastern Regional Home Service Conference, held in Atlanta, Ga., Miss Frances Armin, consumer education director, National Adequate Wiring Bureau, second from left, explained house wiring survey sheet to Miss Allene Epps, Tampa Electric Co., Miss Joie Kammer, New Orleans Public Service, and Miss Ida Lansden, Virginia Public Service Co. (Right above) Representatives of manufacturers and utilities who attended from left to right, Johnny Nee, Hotpoint; Roy Palmer, Duke Power; Henry Setze, Georgia Power; Jimmy Averett, Savannah Electric; Hugh Dodgen, Georgia Power; E. E. Mack, Georgia Power; A. F. Eichenlaub, Frigidaire Division; Muse Mann, Georgia Power, and Jimmy Crew, G-E Lamp Division. (Lower right) Miss Fern Snider, chairman of the E.E.I. home service committee and home service director of the Georgia Power Company, discusses wartime food problems with Mrs. Mildred Seaber, Duke Power Company, Salisbury, N. C., and Miss Cordelia Foster, Tidewater Power Company, Wilmington, N. C.

THE FIRST Southeastern regional conference of the Home Service Committee of the Edison Electric Institute held recently in Atlanta included discussion by national leaders in the field of manufacture and consumer education of "what home service can do to lay the groundwork for the postwar period."

Presided over by Miss Fern Snider, chairman of the EEI Home Service Committee, and home service director of the Georgia Power Company, the two-day conference was attended by nearly 150 persons, including home service workers from 16 electric utilities in eight Southeastern states, and representatives of four appliance manufacturing companies.

Among the utilities represented were the Appalachian Electric Power Company, Bluefield, W. Va.; Monongahela Power Company, Fairmont, W. Va.; Virginia Public Service Company, Alexandria, Va.; Appalachian Electric Power Company, Roanoke, Va.; South Carolina Power Company, Charleston, S. C.; Duke Power Company, Charlotte and Salisbury, N. C.; Tidewater Power Company, Wilmington, N. C.; Louisiana Power and Light Company, New Orleans, La.; New Orleans Public Service Company, New Orleans, La.; Savannah Electric Power Company, Savannah, Ga.; Georgia Power Company; Georgia Power and Light Company, Valdosta, Ga.; Tampa Electric Company, Tampa, Fla.; Florida Power Corporation, St. Petersburg and Clearwater, Fla.; Birmingham Electric Company, Birmingham, Ala.; Alabama Power Company, Birmingham, Ala.; American Gas and Electric Service Corp., New York City.

Appearing on the opening morning program were C. A. Collier, vice-president of the Georgia Power Company; Irving Clark, manager of the Better Homes Department, Westinghouse Electric and Manufacturing Company. Pittsburgh, Pa., and Mrs. Mary Davis Gillies, home furnishings editor, McCall's Magazine, New York.

Monday afternoon speakers included E. W. Commery, residential lighting manager of the General Electric Company Lamp Division, Cleveland, Ohio; Miss Ada Bessie Swann, Woman's Home Companion Magazine, New York City; Miss Margaret Davison, home economics director, Edison General Electric Appliance Company, Inc., Chicago, Ill.; and Miss Frances Armin, consumer education director, National Adequate Wiring Bureau, New York City.

Speakers at the Tuesday morning session included Miss Verna Miller, home economics director of the Frigidaire Division, General Motors Corporation, Dayton, Ohio, and Miss Camille Beauchamp, new assistant manager of the Westinghouse Home Economics Institute, Mansfield, Ohio.

The conference was brought to a close with a lively round-table discussion of home service activities. Mrs. Selma Andrews, home service director of the Appalachian Electric Power Company, Bluefield, West Virginia, described her company's success in keeping electric ranges in operation in the home economics departments of local high schools.

Roy Palmer, sales and advertising manager of the Duke Power Company, Charlotte, N. C., pointed out some of the disadvantages of proposed applications of fluorescent lighting in homes. He said that lighting should be more functional in homes and less decorative as in the past. He urged utility home economists to keep developing a desire among customers for higher lighting intensities

with lower brightness levels.

The consensus of the speakers on the conference program was that sound thinking and intensive effort on the part of utility home economists during the war will contribute greatly toward counteracting the "dream schemes and models" talked and advertised by some appliance manufacturers and distributors, and make way for the type of equipment that will gradually become available for residential sales.

Building Prospects Discussed

In analyzing the prospects for residential construction following the war, Irving Clark said there will be "25 to 50 per cent more money spent on modernization than on new construction. The major bottleneck is wiring — it has not kept pace with appliance development to date."

Miss Armin, of the National Adequate Wiring Bureau, pointed out that "in order to learn about wiring in the home of tomorrow, we must know more about the wiring in the home of today. Wiring is an unseen value. We must educate people now to forestall acceptance of minimum standards permitted by the wiring code. Yesterday, today, and tomorrow, our homes will depend on electricity. Wiring must be kept adequate in order to keep a home from growing out of date electrically."

Miss Miller, of Frigidaire, traced the growing interest in frozen foods. "The big job for home economists," she said, "is to educate the public as to the importance of proper selection, preparation and packaging of foods." She pointed out that the Frozen Food Institute recommends modern kitchens for all locker plants, where competent instructors will be available to supervise preparation of foods.

Rural Market Growing

The big rural market for new electric appliances was spotlighted by Hotpoint's Miss Davison. Said she: "Farm women and new homemakers present wide fields for home service contacts. Farm incomes are up above general income rise, and women have a better appreciation of the advertising of electrical devices."

The three kinds of housewives were defined by Miss Swann, in reporting a Woman's Home Companion survey on what modern women want in their kitchens and homes. She said the "balanced homemaker" was the easiest for home economists to help, but that the "career woman" and "pure housewife" were in the majority, with the former being too exacting in their expectations of appliance performance, and the latter not expecting enough of appliances.

Miss Beauchamp, who has just assumed duties as assistant manager of the Westinghouse Home Economics Institute, predicted more use of "time and motion studies" by manufacturers in developing new home laundry and other equipment.

Freezer Locker Plants Promoted in Geogria

(*Continued from page 16*)

freezer-locker specializing firm.

C. T. Baker, Atlanta consulting refrigeration engineer, recalled the development of cold-storage and freezer-locker plants, and urged that every plant should be engineered for efficiency and economy of operation.

The designing of freezer-locker plants was explained by J. B. McCrary, president of the J. B. McCrary Engineering Company, which has been active in the design and construction of freezer-locker plants in the Southeast.

J. H. Layman, district manager of the Armstrong Cork Company, opened the second day's program with an evaluation of insulation for the sub-zero temperatures required in a freezer-locker plant. He also closed the day's sessions by showing the technicolor picture of a modern freezer-locker plant, entitled "Revolution in the Pantry."

The care that should be exercised in the selection of refrigeration equipment for a freezer-locker plant was emphasized by C. P. Goree, district manager of the Frick Company. He urged the use of at least two compressors in every freezer-locker plant, regardless of its size, due to the difference in the temperature required for quick-freezing and storage, and that required for the chilling and aging room.

Hoyt Turner, professor of food processing at the University of Georgia's College of Agriculture, explained the "Freezing of Meats, Fish and Poultry." He also contributed the chapter on that topic to the new freezer-locker plant manual.

Dr. J. G. Woodroof, food technologist of the Georgia Experiment Station and nationally cited for his research on frozen foods, covered three topics that are vital in the frozen-food world: the freezing of fruits and vegetables, the packaging of frozen fruits, and the thawing and use of frozen fruits. He contributed detailed chapters on these subjects to the freezer-locker plant manual.

Power Company's Interested

W. B. Farnsworth, customer service manager of the power company, pointed out the utility's interest in freezer-locker plants, in opening and closing talks at the school. "The power company is promoting the construction and operation of freezer-locker plants in Georgia because it will help improve the cold-cash income and standard of living of our farm families," he declared. "Increased income will make it possible for them to buy and enjoy more electric appliances in their homes. The revenue from power consumed by the freezer-locker plants is, of course, a secondary interest we have in the expansion of the freezer-locker industry throughout our state."

It was pointed out at the school that the Georgia Power Company back in 1941 had designed and merchandised a 50-locker plant for use in connection with community canneries. Twelve of these plants were sold, but only six were installed before war caused the WPB to halt construction and delivery of the others. In the present program, the power company is not selling any equipment, Mr. Farnsworth said. "We only endeavor to assist individual customers or groups in planning for a freezer-locker plant."

26 Plants in Georgia

The 26 plants in existence in Georgia, according to the new manual, range in size from 12 lockers on a dairy farm near Calhoun to 500 lockers at two of the state's oldest, privately operated plants—those in Albany and LaGrange. Plants that have just been placed in operation include a 365-locker plant at Commerce, and a 410-locker unit in Elberton.

Of the 29 plants for which plans or construction are underway, the majority are to be built with private capital but operated at low community-cooperative rates.

Producing for WAR COMMUNICATIONS

The facilities of the Mitchell organization . . . the skill and energy of Mitchell men and women . . . today are devoted primarily to the production of gas-engine generator sets . . . for use in the U. S. Signal Corps and the Armed Forces of our Allies. These generator sets are used on every battle front —in scout cars, anti-aircraft artillery, and other military equipment—to provide the power necessary for vital radio communications. They can be operated by combat soldiers as easily as by highly trained radio personnel. Naturally, they must be thoroughly dependable.

MITCHELL Manufacturing Company
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Mitchell Lighting Fixtures for War Industry

Mitchell Fluorescent Fixtures provide simpler, more efficient, more flexible lighting, at low cost, for work areas in war industries. "MITCHELITE" fixtures for plant lighting. MITCHELL "U.R.C." for office and drafting rooms.

MITCHELL

BACK THE ATTACK
BUY WAR BONDS

Women Learn Electrical Trade in Marine School

By Elaine Rueter*

FETCHING as she is in her forest green uniform, today's lady Marine may also be said to be a wiry little person of parts.

At any rate, when the lights go on again all over the world you may be sure there will be nothing wrong with the wiring, fuses and other household electrical equipment in any home which has lately seen the return to domesticity of a member of the U. S. Marine Corps Women's Reserve.

*Staff Sergeant, U. S. Marine Corps Women's Reserve, St. Louis, Missouri.

Not the least of the training these talented young women are receiving in their task of replacing men going to combat duty is electrical work.

Few of the home's wiring, lighting or mechanical facilities are mysteries now to these girls. In fact, it is hardly likely that any of them, when peace returns, will ever have to resort to the once-standard:

"John, there's something wrong with my electric iron. Will you see if you can fix it?"

Although the number is small, women Marines are being trained as electrician's helpers at the U. S. Marine Corps base, Camp Lejeune, New River, North Carolina.

Various aptitude tests are given all the women Marines during the first week of their boot training to determine the job for which they are best fitted. A few who have scored high in mechanical aptitude are chosen for electrical training.

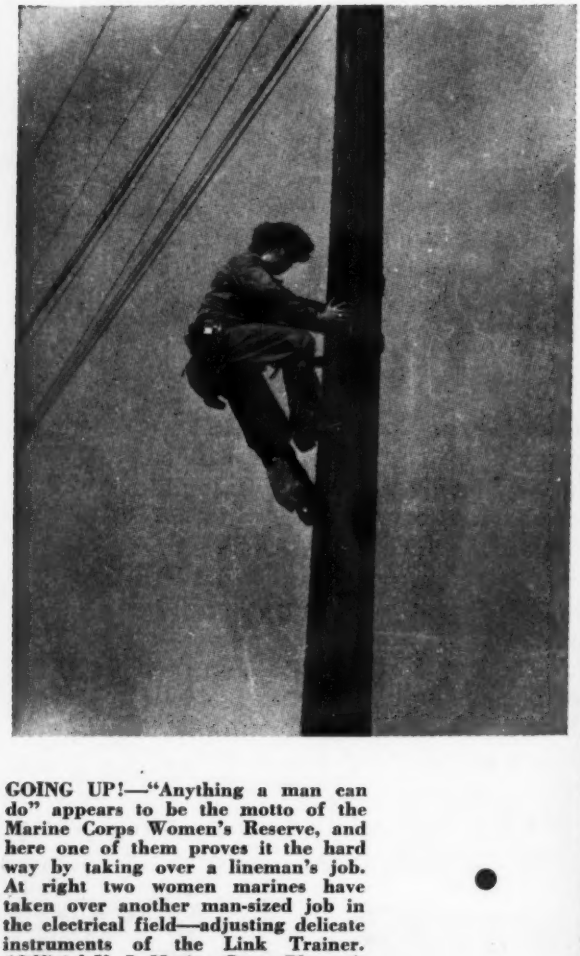
Training Is Practical

Most of their knowledge is gained from practical experience. At the beginning of the six weeks training period they learn to replace fuses, repair switches, cords, irons and light fixtures.

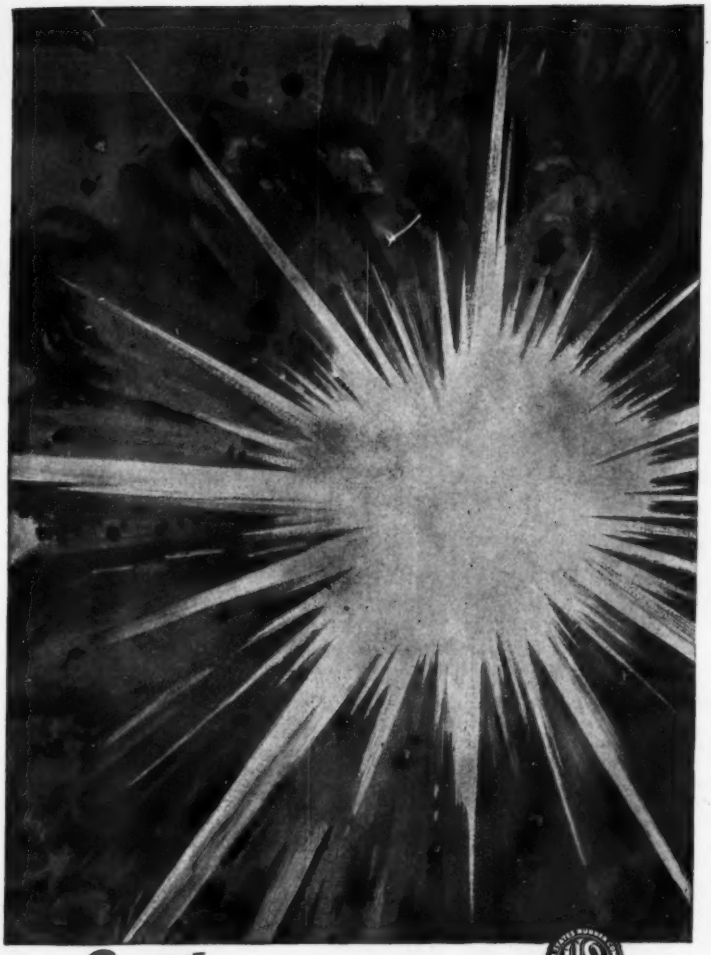
Later they go down into the steam pits and check condensate pumps, lay conduit and threaded pipe.

They are not permitted to handle anything over 220 volts or to climb to a height above 40 feet. With only six weeks instruction, they could not become full-fledged electricians; it takes years of experience for that; but the girls take care of all the minor repairs that would ordinarily take the electricians from some more technical work.

They are particularly valuable when an iron needs to be repaired in one of the women's barracks.



GOING UP!—"Anything a man can do" appears to be the motto of the Marine Corps Women's Reserve, and here one of them proves it the hard way by taking over a lineman's job. At right two women marines have taken over another man-sized job in the electrical field—adjusting delicate instruments of the Link Trainer. (Official U. S. Marine Corps Photos.)



WHEN A SHELL "WHUMPS" INTO THE EARTH...

...everything brittle for yards around may shatter.

That's why it's so important for the electrical insulation on wires and cables to retain its resiliency under all conditions of service. It does...on Laytex Wires and Cables... even when the weather changes from tropical heat to below zero within hours...also when subjected to continual vibration and repeated shock.

This enduring resilience of Laytex insulation is due to (1) The purified ingredients in the compound, (2) The unique process of building up a homogeneous insulation around the conductors by continuous dipping, drying, and vulcanizing. This combination results in perfect centering of conductors within an insulation so high in dielectric strength that the overall diameter can be appreciably reduced with safety.

Consequently Laytex Wires and Cables are lighter in weight, easier to handle, ship and store than those with conventional types of insulation...and they are also unaffected by long exposure to moisture.

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SKI TROOPS USE Laytex Assault Wire for front line field telephones. On Detectors, Guns and Lights other types of Laytex Wire and Cable are used for power, signalling and control. Insulation of Laytex Wires and Cables withstands extremes of temperatures of all climates.

LAYTEX IS GLOBAL WIRE—All available facilities for producing U.S. Wires and Cables are still being devoted to the gigantic needs of the Armed Forces throughout the world.

We are repeatedly asked if we can furnish wire and cable for commercial and industrial uses. Not yet. But the time can't come too soon for us to resume peacetime manufacturing of Wires and Cables for Buildings, Police and Fire Alarms, Communications, Signalling, Power and Control.

Listen to the Philharmonic-Symphony program over the CBS network Sunday afternoon, 3:00 to 4:30 E.W.T. Carl Van Doren and a guest star present an interlude of historical significance.

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Southwestern Contractors Meet Discuss Organization Problems

By Baron Creager

MEETING in Fort Worth, Texas, March 25 and 26, for two days devoted to consideration of present and future problems, 70 electrical contractors discovered that the National Electrical Contractors Association, in a relatively short period of time, has made notable progress in organizing the Southwest into a solid front capable of meeting economic hazards of post-war business.

A year ago there was one active NECA chapter in this territory. Today, seven chapters are functioning with three in the process of organization, and with every prospect that the goal of NECA—complete organization throughout the seven states—will be accomplished in a period of weeks.

Guided by Paul M. Geary, assistant general manager and field supervisor for NECA, from Washington, assembled contractors devoted one full session to discussion of technical procedure in chapter operation. They heard chapter managers discuss the jobber, surplus material, appliance and legislative problems, and closed their brief but busy convention after a joint meeting with 60 representatives of the International Brotherhood of Electrical Workers.

The convention was held in the geographic center of the present seventh district, consisting of the states of Kansas, Oklahoma, Texas, New Mexico, Arkansas, Louisiana, and Colorado. It is proposed that a realignment of districts be made in the national convention in St. Louis in April and that this southwestern area then become the fifth district.

Southwestern organization has been brought about under the leadership of George Seaman, southwestern manager for NECA, and Seaman was the recipient of much praise for the manner in which he activated his district in approximately nine months of working time.

Aside from the keen interest shown in NECA procedure through chapters, the most spirited discussion of the convention revolved about the problem of appliance sales after the war. It was prompted by a paper by Matt Dorsett, manager of the Fort Worth chapter.

Paul M. Geary, left, assistant general manager and field supervisor for the National Electrical Contractor's Association, congratulates George Seaman, southwestern manager for NECA, on his splendid work in organizing NECA Chapters in the seven-state southwestern district.

Seaman had previously put the district on record in favor of eliminating all appliance sales by utilities in states where the practice has not been adopted, and had estimated that 60 per cent of NECA members want to sell appliances after the war.

But Dorsett pointed to the vigorous competition that may be expected from department stores, drug stores, and miscellaneous merchandisers in general. Although the discussion was intended to show ways and means for "getting the electrical merchandising business back into the hands of the electrical contractor-dealer," these points were brought out:

One group of powerful oil firms is now seeking to lease new types of locations where dealers may appeal to the electric appliance and radio prospect; utility competition is the most difficult to meet because of super-attractive installment terms; to be successful in the appliance business a contractor must have a "glamorous" location that will appeal to women, who do most of the household buying; there has not been enough effort put into appliance sales by contractors, who have been overlooking attractive profit lines thereby; utilities will not readily relinquish their right to sell appliances and first want assurance that other appliance outlets will be sufficiently aggressive to build the desired load; the postwar era is the best opportunity for contractors to get back into the appliance field; after the war there will be many new manufacturers of appliances and the demand for outlets will be so great that competition will be terrific.

These conflicting viewpoints resulted in a stalemate and the discussion was inconclusive, except on utility appliances sales. It was generally agreed that if the contractor is going to consider getting into the appliance business he wants utility competition eliminated and this objective is included in the district legislative program.

Geary traced for the convention the progress and growth of NECA from the time of its organization at Buffalo, N. Y., in 1901. He related that NECA had forestalled many tricks and subterfuges of prime contractors in government work.

"Our efforts in the field, added to our efforts in Washington," he said, "resulted, according to the record, in subletting by prime contractors of the electrical work on more than 95 per cent of government financed war construction projects. Very few prime contractors with a cost-plus-a-fixed-fee construction contract voluntarily sublet the electrical work. If it had not been for organized effort in the electrical construction industry, electrical contractors would have been excluded, and every prime contractor would have come out of this war construction program with an electrical construction department of his own permanently established at the expense

of the federal government.

"We hope to organize in every locality, or larger area, a permanently established, legally conducted, truly representative, adequately financed chapter of NECA, each employing a manager to look after its affairs and carry out in the chapter's jurisdiction the plans, policies, and procedure nationally established for the protection and promotion of the industry.

"The accomplishment of this program is especially important at this time to every electrical contractor. We all know that when the war has ended the economy of this country cannot return to what it was in pre-war days. There must and will be a new economy. If the electrical contracting industry wants to have a place in it, that place will have to be secured and protected by organized effort. A thoroughly coordinated national and local effort will be required."

Geary devoted most of his time to answering questions directed at him by many contrctors concerning national and local policies and procedure by NECA.

Seaman prefaced his address with the prediction that after the war there will be 500 additional contractors in the field in the southwestern district. He declared that many war workers are saving for the purpose of getting into business and pointed out the advantages of close NECA organization to keep a tight rein on the competitive practices that might result.

Seaman identified the seven functioning chapters as follows:

South Texas chapter, San Antonio, Fred Loth, president; Temple Wheeler, manager.

Dallas chapter, J. L. McClure, president; W. C. Bryant, manager.

Southwest Texas chapter, Houston; C. E. Seiders, president; Charles Scholibo, manager.

Fort Worth chapter, Cliff White, president; Matt Dorsett, manager.

Greater New Orleans chapter, J. M. Nunaz, president; I. G. Marks, manager.

Oklahoma State chapter, headquarters at Oklahoma City; C. B. Snyder, president; George Hardwicke serving part time until full time manager is selected.

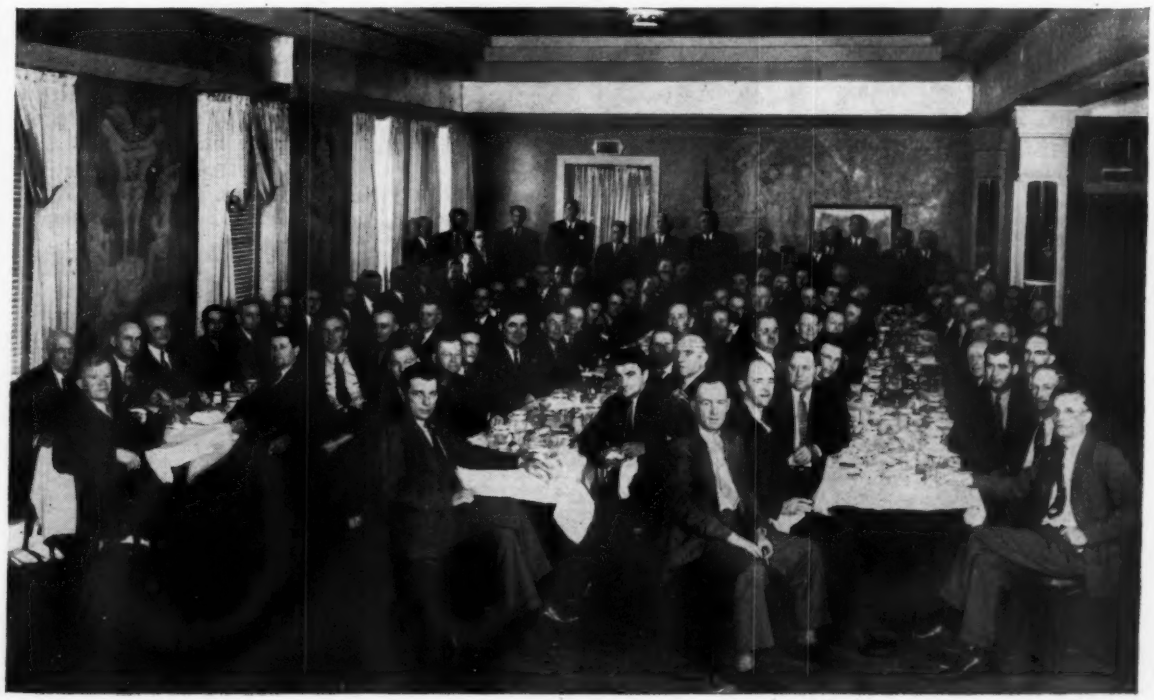
Kansas State chapter, headquarters at Wichita; S. D. Thacher, president, and seeking full-time manager.

Preliminary organization work has been done for the following three chapters; Northern Louisiana-State of Arkansas chapter to headquarters at Shreveport; New Mexico-West Texas chapter to headquarter at Albuquerque; Colorado State chapter to headquarter at Denver.

In a paper dealing with contractor-jobbing relations, Charles Scholibo, manager of the Southwest Texas chapter at Houston, declared that jobbers "who refuse to co-operate on any program for the industry's betterment or who even refuse to discuss such matters with chapter representatives" are hiding "behind the curtain of virtuous self-satisfaction . . . by creating the thought that such meetings or discussions for the betterment of our industry constitute collusion."

Asserting that "the normal program in our industry is frequently disturbed by so-called wholesale distributors selling materials and equipment direct to the consumer, without due regard for either, or consideration for the electrical contractor," Scholibo offered a resolution for consideration of the various chapters. It resolved "that the membership of our chapter be urged to adopt an accurate method of cost-finding and estimating and in those instances where materials are supplied by others, all elements of cost be carefully compiled before making a commitment to furnish labor only."

(Continued on page 50)



Basic Use and Maintenance Of Electrical Instruments

By H. S. Day*

Part 7—Selection and Setting Up

(*Editor's Note: This is a continuation of the series of articles on electrical instruments that began in the October 1943 issue. The first six articles discussed the basic operating principles of instruments. This article and several to follow will discuss proper use and care of electrical instruments.*)

SINCE instruments play such an important part in the maintenance of all types of electrical equipment, the discussion to follow covers not only their maintenance, but also the ways in which they should be used. Best results in the use of instruments depend upon the proper original selection. The accuracy desired and the cost are the two important factors in selection. Instruments should be chosen on the basis of obtaining the required accuracy at the least cost.

Following is a nine-point guide to proper selection:

1. What accuracy is desired?
2. Should it be a-c or d-c?
3. Should it be portable or for switchboard mounting?
4. Should it be indicating or recording?
5. What is the desired rating? The range should be such that the instrument reading is usually above one-third scale.
6. If a switchboard instrument is desired, should it be of the surface-mounting or semiflush-mounting type?
7. Can a standard instrument listed in the manufacturer's catalog be utilized in order to obtain lowest cost and best delivery?
8. What effect will the instrument have on the circuit in which it is to be used? For example, some applications require a voltmeter with high resistance for minimum current drain. Or, an ammeter may have to have a low volt-ampere rating if it is to be used with a through-type current transformer.
9. Conditions under which the instrument is to be used are important. Indoor or outdoor, humidity, or corrosive atmosphere may require special instruments.

*Mr. Day is associated with the Meter and Instrument Division, General Electric Company, Schenectady, New York.

Fig. 1. (Left) The hook-on voltameter is a particularly handy instrument for measuring a-c loads and voltages. Fig. 2. (Above) This is proper position for reading portable instruments. Fig. 3. (Right) Never use instruments near strong fields such as the cables shown here which are connected to a generator.

When any question arises on the use of a specific instrument, it is recommended that the information be obtained from the manufacturer. Any request for information on instruments should be complete with all the information shown on the instrument nameplate — its rating, serial number, when the instrument was purchased, and a description of the special conditions under which the instrument is used.

It is most important that correct setting up for use be followed. There are a few general rules that should be followed for all instruments as well as specific provisions for certain types of instruments.

All Instruments

1. Read manufacturers' instruction book carefully.
2. Instruments should be handled carefully to avoid all vibration or shocks which may injure the instrument bearings.
3. From the nameplate of the apparatus on which the measurement is to be made, estimate the value of the current, voltage, etc., to be measured.
4. If an instrument has more than one tap or range, make connection to the highest range first to avoid injury to the instrument.
5. Instruments should always be in a level, horizontal position (see Fig. 2), switchboard types in a vertical position.

Portable Instruments

1. Metal benches should be avoided, as the instrument indication may be affected by the proximity of the metal.
2. Proper sized leads should be used. Terminals should be clean to avoid high contact resistances,

(*Continued on page 60*)

Oklahoma Utilities Executives Appraise Postwar Markets

By O. D. Hall

A GREAT potential market awaits the electric light and appliance industries after the war, A. A. Brown, vice president, Oklahoma Gas and Electric Co., Oklahoma City, Okla., told delegates to the annual convention of the Oklahoma Utilities Association, meeting at the Biltmore Hotel, Oklahoma City, March 14. Approximately 200 electric and gas utility executives and employees attended.

Whether the great market pictured by Mr. Brown becomes an actuality or remains a dream depends upon a political economy which will encourage industrialists to take financial risks and also upon the vision and enterprise of utility leaders in going out after this business. He cited several conditions which support his belief that a vast potential postwar reservoir of business exists for the utilities as well as for other aggressive business leaders.

These include: underbuying of essentials during the depression due to lack of sufficient purchasing power; the great demand for materials, products and services which will accompany replacement of property destroyed or used up during the war; a great reservoir of individual wealth and increased buying power due to increased incomes and inability of the people to buy many things which they need; the potential market for new products; the creation of advances in science such as electronics, plastics, television and other similar developments; and incentives for increased farm production to meet food shortages all over the world.

If an intelligent soil conservation program is carried out during and after the war, the American people will learn again to depend more on the soil as the basic and true source of all wealth, Elmer T. Peterson, editorial writer on the *Daily Oklahoman*. told the public utility people in general session.

"The energy equivalent to about 24,000,000 men, reckoned in the aggregate, full-time and part-time work should have the opportunity to produce their own food on their own individual land tracts, therefore becoming independent and self-sufficient," said Mr. Peterson. "When a part of our economy gets too far away from the soil, no matter what the money factor may be, it becomes more and more vulnerable, because too many people have lost their supply lines to the soil.

"We should bring back the tractors, bulldozers, fresnoes, jeeps and other machines to our fields after this war is over and put them to work on rebuilding our soil," the speaker continued. "We should put our money in construction of billions and trillions of little dams, some so small you can see them only through a microscope."

"While advocates of public power are seeking 100 million dollars in additional appropriations to spend on build more great power and so-called flood control dams, some of the existing dams have been used to produce more electricity instead of to control floods. I am not so much concerned over the question of public ownership or private ownership as I am over what the big flood in the Arkansas and Grand rivers and their trib-

(*Continued on page 60*)

Among those attending the annual convention of the Oklahoma Utilities Association were, left to right, Frank B. Hathaway, General Electric Co.; Walter B. Gesell, Oklahoma Gas & Electric; C. N. Robinson, Public Service Co. of Okla.; J. C. Happenny, Oklahoma Power & Water; Glenn C. Kiley, Oklahoma Gas & Electric; J. A. Whitlow, Public Service Co. of Okla.; and F. J. Meyer, Oklahoma Gas & Electric, the retiring chairman of the electric division. Above, E. C. Joullian, president of Consolidated Gas Utilities Corp., and president of the Association, who presided.

A NEW Westinghouse

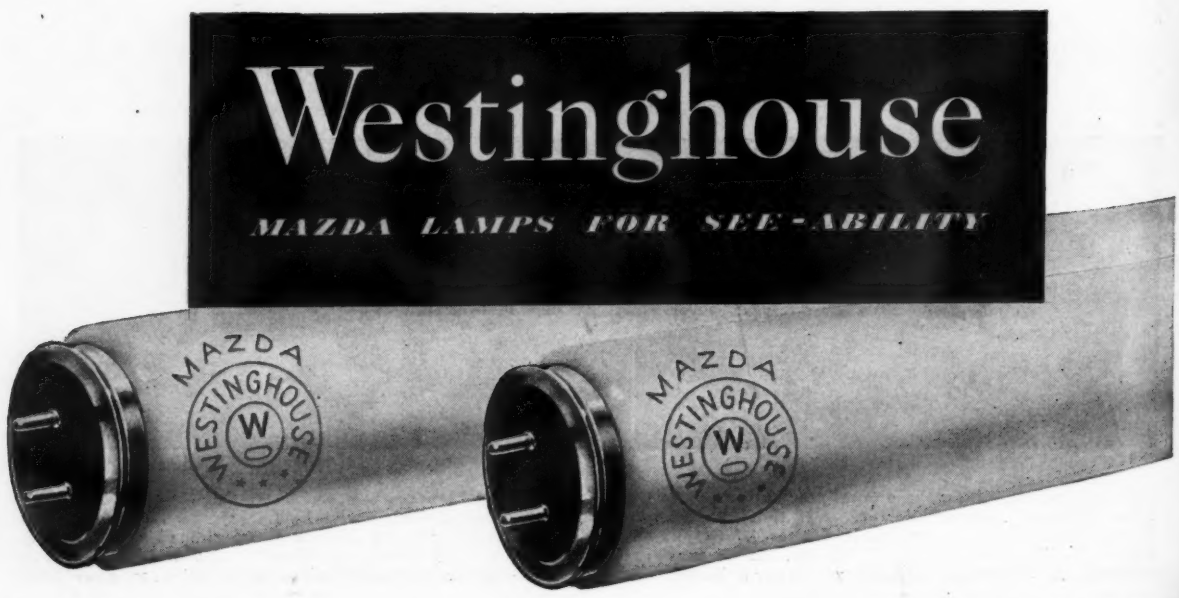
The increased use of instant starting ballasts for 40 watt lamps has developed the need for a lamp which will operate satisfactorily on such ballasts. Westinghouse engineers have now perfected a lamp for this purpose.

This new 40 watt white Westinghouse Mazda Fluorescent lamp will have the same rated life when operated on the instant starting ballast that the standard 40 watt Westinghouse Mazda Fluorescent lamp now has when used with conventional ballasts and starters.

It should be ordered only for use on the instant starting ballast and should not be ordered for use in installations having preheat starting. It will be specially marked and will have the same list price as the standard lamp. Limited quantities of these lamps will be available for shipment on and after May 1, 1944.

New developments such as this typify the skill and resourcefulness of Westinghouse engineers. Based on a persistent policy of product improvement, they are the reason why the name "Westinghouse" has come to mean leadership in lighting.

They are the reason, too, why it pays to recommend Westinghouse Mazda Lamps for every lighting application and installation. Westinghouse Elec. & Mfg. Co., Bloomfield, N. J. *Plants in 25 cities . . . offices everywhere.*



FLUORESCENT LAMP

LET'S ALL KEEP BACKING THE ATTACK... BUY MORE WAR BONDS

Ground Resistance Reduction Studied Over Long Period

By J. A. Rawls*

THE VIRGINIA Electric and Power Company became very much interested in reducing the resistance of ground electrodes on its system in 1930. It was necessary to have low ground resistances at substations for safety as well as to secure the desired results from lightning protective devices.

In order to determine the best material to use for ground electrodes as well as the most effective treatment and the approximate life of the treatment, test electrodes were installed at one location on the system in the years 1931, 1932 and 1933. All of the electrodes were tested approximately once a month for the first few years after they were installed and this time was gradually increased until the present when they are tested annually.

The soil at the location selected for the test grounds is composed of two feet of fine loam on top followed by eight feet of firm red clay. The soil under the clay is red gravel. All of the ground tests were made with a Biddle 0-3000 ohm direct reading Megger ground tester. Since the resistance of ground electrodes depends on the amount of moisture in the soil, the annual rainfall as recorded at a U. S. Weather Station a few miles from the test location is shown as a curve on the ground resistance test sheets.

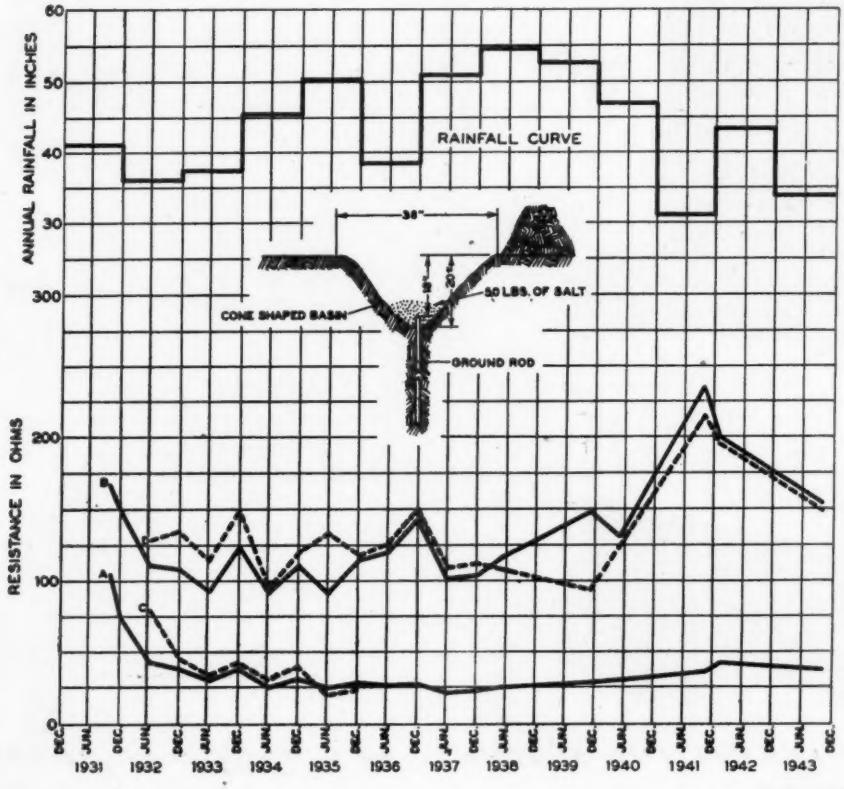
Effect of Salt

The accompanying test sheets show a few typical ground electrodes which were used for the tests. Some electrodes are untreated and some are treated with salt; various kinds of salt were used; all of which is explained in the test sheets. The results indicate that certain kinds of salt are better than others for grounding purposes. Ground electrode "C" was removed the early part of 1936 in order to check the reaction of salt on the galvanized surface. The effect of the salt on the galvanized surface was not nearly as noticeable as was the effect on the copper coated rods. Whenever salt is referred to on the curves, crushed rock (ice cream) salt was used. If special brands of salt were used, an explanation is given in the legend on the test sheets.

Conclusions from Tests

The results of the tests over a twelve year period indicate to us that salt is as lasting and as inexpensive method of treatment as any and that the galvanized steel rod has satisfactory life with this treatment. The tests also indicate that a 5-8″ diameter 8 ft. long rod is practically as good as a 3-4″ diameter 8 ft. long rod. After studying the test results, this Company standardized on 5-8″ x 8′-0″ galvanized ground electrodes with ordinary ice cream salt as the treating material where necessary.

*Mr. Rawls is construction engineer for the Virginia Electric and Power Company, Richmond, Virginia.



The results of the ground rod resistance tests over a period of more than thirteen years are plotted in the accompanying curves. Rainfall curves are shown for the same period. Sketch shows general arrangement of rod and excavation. Resistance curve designations are as follows:

(A) 8′ x ¾″ Copperweld rod treated with 50 lbs. of salt in cone shaped hole.

(B) 8′ x ¾″ Copperweld rod not treated.

(C) 8′ x ⅝″ galvanized iron rod treated with 50 lbs. or rock salt (5 lb. lumps) in cone shaped hole.

(D) 8′ x ⅝″ galvanized iron rod not treated.

(E) 8′ x ¾″ Swars (thin "U" shaped copper) rod treated with 50 lbs. of salt in cone shaped hole.

(F) 8′ x ¾″ Swars (thin "U" shaped copper) rod not treated.

(G) 8′ x ¾″ puddle iron rod (not galvanized) treated with 50 lbs. of salt in a circular hole.

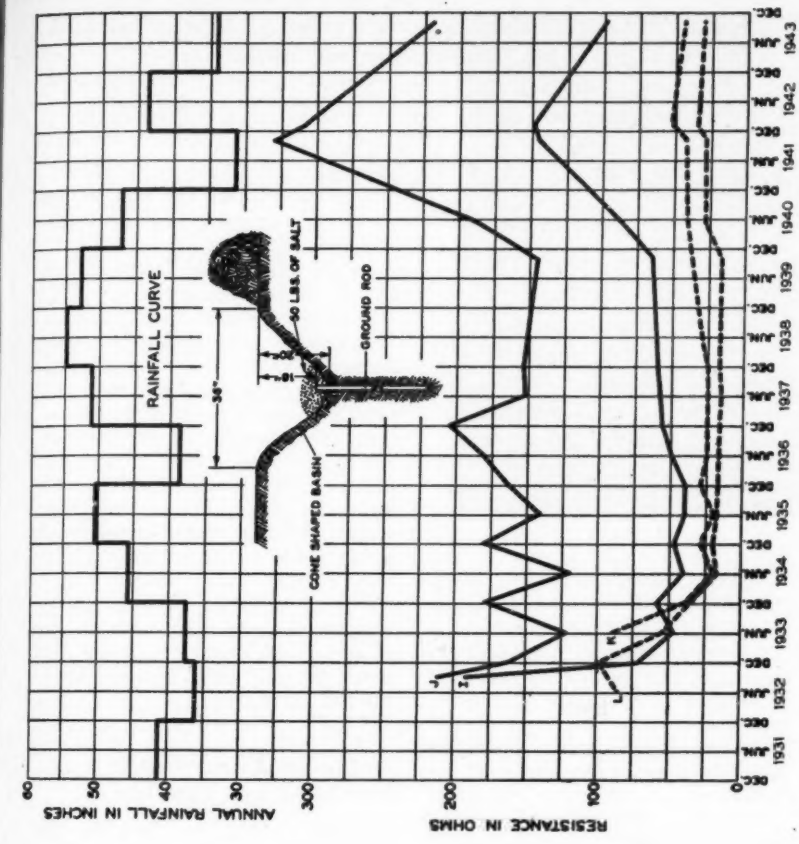
(H) 8′ x ⅝″ puddle iron rod (not galvanized) not treated.

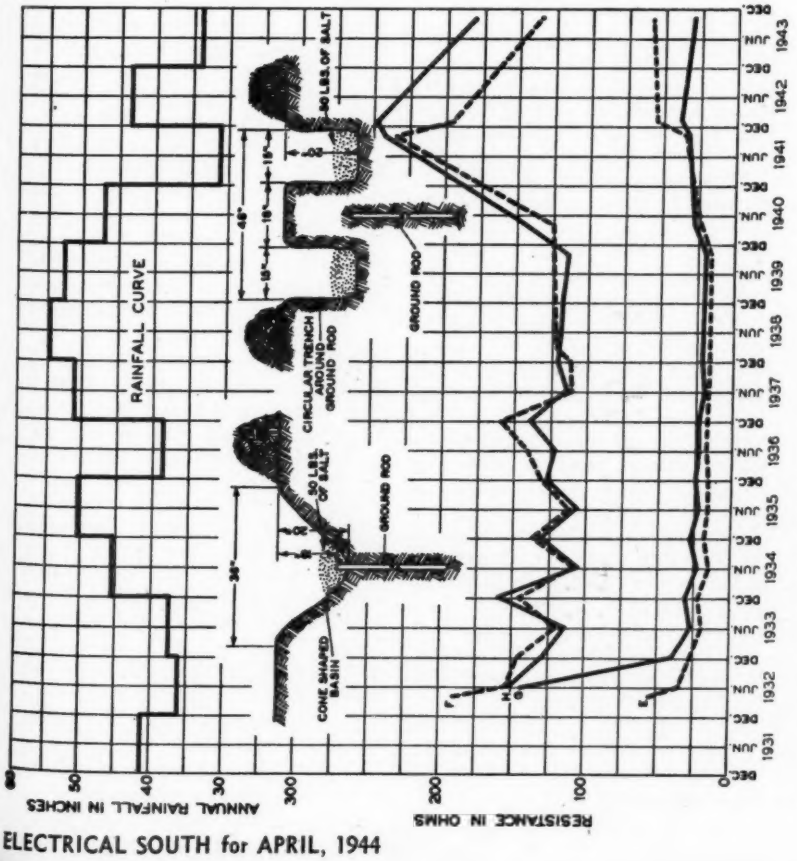
(I) 8′ x ¾″ Tongan iron (cadmium plated) rod treated with 50 lbs. of salt in a cone shaped hole.

(J) 8′ x ⅝″ Tongan iron (cadmium plated) rod not treated.

(K) 8′ x ¾″ Copperweld rod treated with 50 lbs. of J. Q. Dickinson salt in cone shaped hole.

(L) 8′ x ¾″ Copperweld rod treated with 50 lbs. of Louisiana crystal salt in a cone shaped hole.





Visual Training On Electrical Subjects

By L. S. Metcalfe

THE ALREADY widespread and growing use of films in various phases of the electrical industry is in line with the vast program of visual education and training in departments of the government and in wartime industries generally. This is the first of a series of brief reviews of a number of outstanding slidefilms and motion pictures of interest and available to the electrical industry.

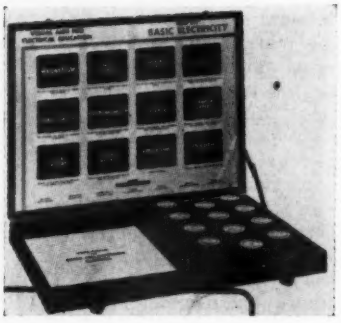
Among the slidefilm series of particular interest in the electrical field is a kit-set of twelve subjects on "Basic Electricity." These films are being widely used in the armed services, especially in aviation, in wartime industries, as well as in schools, to speed up the student's understanding of electrical principles prior to more detailed study of its applications through text book study and workshop demonstration.

Each of these twelve slidefilms provides visual teaching material for a single lesson or session. This form of film is called the "reading" or discussional type of film which is a strip of 35 mm safety motion picture film, on each segment or frame of which is a picture — special photograph, drawing, chart, diagram or other pictorial exhibit — arranged in logical and proper sequences to visualize a procedure, delineate a fact, or to present an idea. Letterings, legends and notations are superimposed on the film and projected with the illuminated visual material on wall, floor, or screen. The instructor thus uses the visual material as an aid in arranging his instruction, and with the use of pictures can save as much as 40 per cent of the time otherwise needed for a student to complete such a course.

Of the twelve individual subjects in "Basic Electricity," the first six will be briefly outlined here, others to be reviewed in a subsequent article. These twelve films have a total of 888 individual pictures. The first six subjects are:

Magnetism: This subject, with 56 individual scenes, is intended to help the instructor reveal to the beginner the general properties and laws of magnets, and to delineate magnetic effects for the student.

Just as the earth has two poles, every other magnet has two poles. We can see this if we place a magnet in a pile of iron filings. The filings cling to the ends or poles of the magnet.
N
S
If we hang a straight magnet by a thread, the pole of the magnet which points toward the north is called the NORTH-SEEKING POLE or just the NORTH POLE. The south-seeking pole is called the SOUTH POLE.



The use of visual training film is growing rapidly. In wartime industries, utility companies, and schools, instructors and group study leaders are finding that such special film speed up the student's understanding of technical subjects. Typical frames from a kit of twelve subjects on Basic Electricity are shown in center above.

Static Electricity: This slidefilm subject in a total of 91 pictures outlines the principles of the electron theory of positive and negative charges.

Current Electricity: 73 individual pictures in this subject portrays basic principles of current flow in the various types of circuits.

The Electric Cell: Change of chemical energy into electrical energy is covered in this one. Primary and secondary cells.

The Storage Battery: 101 individual pictures which help the teacher convey the basic principles of commercial storage battery construction and use are combined in this film.

Electromagnetism: 56 lighted pictures in this subject cover the construction and use of the electromagnet, and reveal effects of the electromagnetic field.

The techniques of most effectively integrating slidefilms of this type into industrial courses have been steadily developed and improved as a result of wartime speedup necessities, and the immense demand for skills in the war industries, wherein electricity in all its phases plays such an important part.

Generally speaking, the electrical industry uses a teaching procedure along these lines in giving basic instruction to new personnel — usually totally untrained:

1. Introduction of the subject by the instructor or leader with personal commentary.

2. Projection of the slidefilm on that subject as the instructor or leader reads off the captions aloud and slowly.

3. Discussion of what has been seen and heard.

4. Reprojection of the slidefilm with prearranged pauses for detailed discussion and elaboration by the instructor.

5. Question and answer period.

6. Summation by the instructor.

This is usually followed by text book study, followed by electric shop demonstration and work projects under supervision.

It will be seen that the function of the film is to make it easier for the instructor—at a time when the industry is short of competent people in that field and reduce the time needed to complete the course by more quickly giving the "green" recruit a general overall understanding of electrical principles, techniques and equipment preparatory to specialized training.

(*Editor's Note*: Further information on these films may be obtained from The Jam Handy Organization, 2900 E. Grand Blvd., Detroit 2, Mich.).

Defective Fuses Cause Hard-to-Find Trouble

FROM TIME to time, in the building where I am employed, we come across conditions where a blown fuse cannot be readily detected. Usually this is due to the fact that the fuse in question is either defective or has blown in such a way as to leave the ends of the fusible link touching or nearly touching.

Such a fuse will often carry enough current to light a test lamp or give a circuit continuity indication on a testing device, yet in service will fail to carry enough current to operate the equipment on which it is used.

Recently, several hours of valuable time was lost by an electrician in trying to locate the source of trouble in an elevator circuit. The elevator was equipped with a motor-generator set, and had a control switch and pilot light in the car for starting and stopping it. Sometimes the pilot light would light when the switch was thrown to "on" position, and the elevator could be run. But at other times, turning the switch on would not light the pilot light and would not start the motor-generator set. Consequently, the elevator would not run.

Finally, after examining switch-

(*Continued on page 59*)

How to Service Sealed System Mechanical Refrigerators

A REFRIGERATING system in which all joints are welded or soldered is called a hermetically sealed system. Such a system has no valves or threaded connections; no joints where refrigerant can leak out or air enter.

As there are no valves or plugged openings of any description, refrigerant or oil cannot be added; gauges cannot be attached. Service on this type of system consists of making a few simple checks and tests electrically in connection with the motor, relay, thermostat and wiring. If corrections of a specific complaint cannot be effected by testing all of the electrical parts, there is little else to do but replace the system.

Before making a quick decision to replace, however, every possible point of the entire system should be thoroughly checked. Since it is impossible to attach gauges, indications of a refrigerant shortage must be obtained from a visual inspection of the cooling unit and a check on the operating time. A shortage of refrigerant will result in long running time; the frost line on the cooling unit will be low. (A high cut-in point on the temperature control will also cause a low frost line).

It is advisable to check the cut-in and cut-out point of the temperature control by means of a dial thermometer, with its bulb clamped by the side of the temperature control bulb, before deciding on the cause of a low frost line. If the trouble is found to be with the control and if the control is the adjustable type, the complaint can be corrected at once.

If the control is not adjustable, however, a control replacement will be necessary. If the control is found to be operating satisfactorily and the frost line is low, you may assume that the refrigerant charge in the system is low, in which case a replacement of the entire system will be necessary.

A very handy instrument to carry when called to service sealed systems is a combination time-and-temperature recorder (Figure 1). This will furnish a permanent record of the running time and the temperature maintained during that period. A recorder is simple to use and furnishes the true picture of operating conditions.

Figure 2 illustrates the method of using the recorder.

Figure 3 shows the refrigerating cycle of a simple sealed system. Note that with this particular system there is no expansion valve or float mechanism for liquid refrigerant control. Instead of a refrigerant control valve, a small diameter liquid line is used. When designing a system to utilize the characteristics of a small diameter tube, it is necessary to consider the sizes and capacities of compressor, condenser and cooling unit. The length and inside diameter of this liquid line varies with the condensing unit size.

The refrigerant vapor is compressed by the compressor and discharged into the condenser where it is condensed to a liquid. It then flows through a strainer to the small diameter liquid line, through which it passes with pressure gradually decreasing until it reaches a larger line at the en-

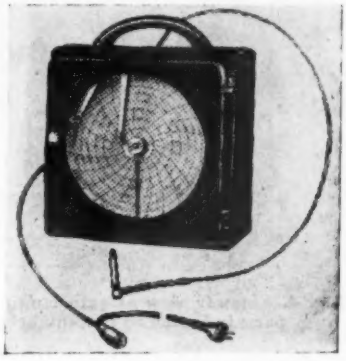


Fig. 1. Combination time and temperature recorder useful for making tests on sealed systems.

Fig. 2. How the recorder is used.

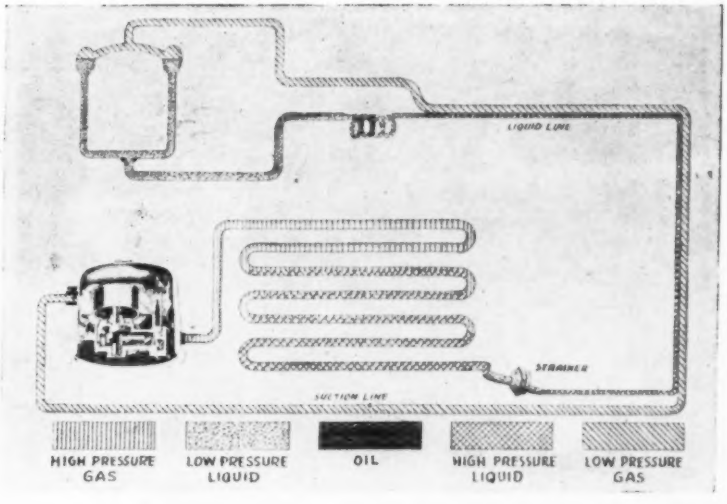


Fig. 3. Refrigerating cycle of simple sealed system.

This article is based on information prepared by engineers of Nash-Kelvinator Corporation.

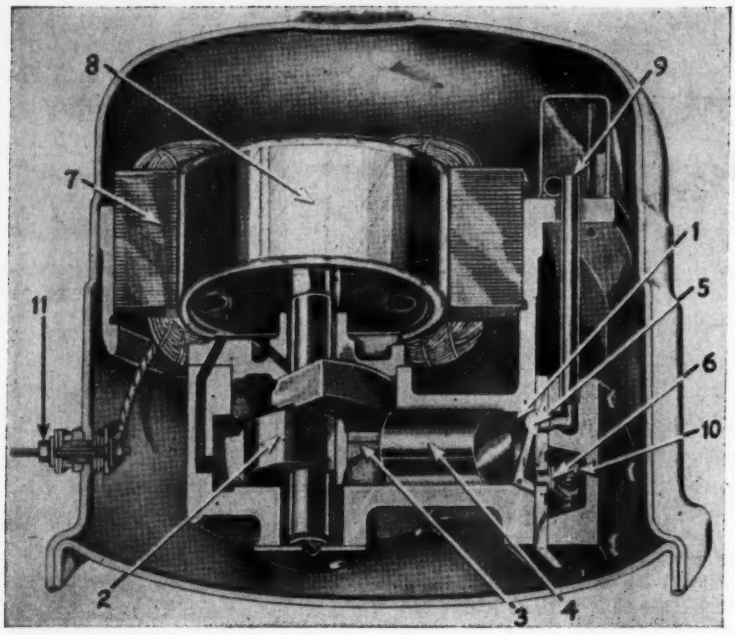


Fig. 4. Cutaway view of sealed unit compressor and motor assembly. The parts indicated by the numbers are identified in the text below.

trance to the cooling unit. At this point expansion and vaporization take place.

The vaporized gas is then drawn back to the compressor through the suction line to which the liquid line is soldered in heat-exchange relationship. The comparatively cool suction vapor absorbs some of the heat from the warm liquid passing through the liquid line, and subcools the liquid, thereby increasing the efficiency of the system.

The suction line and liquid line are soldered together for a distance of several feet in heat-exchange relationship. The cool refrigerant vapor flowing from the cooling unit through the suction line, cools the warm liquid flowing through the liquid line. The temperature of the vapor flowing to the compressor is thereby increased to a temperature above the dewpoint of the air surrounding the cabinet. This eliminates suction line sweating.

The liquid flowing through the liquid line is cooled, increasing the effective capacity of the system. This increase in capacity is most noticeable at higher room temperature. Instead of receiving heat from the room on its normal return to the compressor, the suction vapor receives heat from the liquid in the liquid line. The vapor reaches just about the same temperature with the heat exchanger, as it does without it. The advantage is that the heat gain comes from the cooling of the liquid. Consequently the liquid is less "flash gas." Flash gas is the term used for the liquid boiled off to cool incoming warmer liquid to cooling unit temperature.

Figure 4 is a cut-away view of a popular sealed unit compressor and motor assembly. In this particular type, a single cylinder compressor is used. The component parts are shown as follows: (1) The cylinder (2) eccentric (3) connecting rod (4) piston (5) suction valve and (6) discharge valve.

The cylinder is cast integral with the main body casting into which the stator (7) is pressed. This assembly in turn, is pressed into a steel dome which is closed at the bottom by means of a steel cover, arc-welded into place. This method of assembly gives good heat transfer from the motor stator to the outside of the steel dome over which the cool incoming air passes. The compressor operates in a horizontal position; the drive shaft is vertical and is direct-driven by the rotor (8) which is mounted above the compressor.

This method of construction permits operation of the compressor in oil, simplifying the lubricating problem. The suction intake (9) is placed so that the suction vapor must travel through the holes in the motor rotor in or-

(*Continued on page 58*)

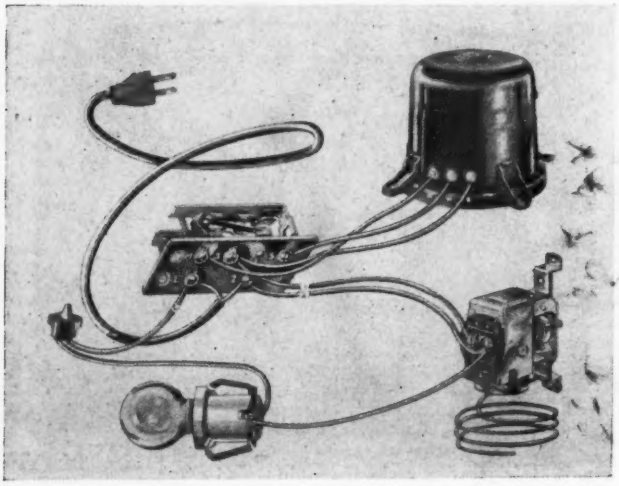


Fig. 5. (Left) Typical wiring circuit for sealed system showing relay, motor, cabinet light switch, and sealed assembly.

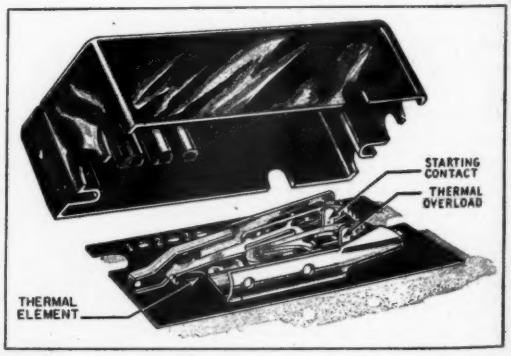


Fig. 6. (Above) Combination relay and overload protective device with cover removed.

Twice in a lifetime

He was just a little fellow a dozen years ago.

Too little to know — or care — that even as he slept, General Motors men in a distant laboratory were putting the finishing touches on a special new refrigerant later given the trademark, *"Freon."**

Much too little to understand that the real reason for developing this new compound was the safety of just such sleeping youngsters as himself.

That it was important because it provided the last link in perfect safety for home or hospital refrigeration, ending even the remote risk of toxic harm in the unlikely event of leaks in the cooling system.

He is grown now, and off fighting for his country on a South Pacific island.

He is old enough to know that one of his deadliest enemies there is the mosquito, carrier of malaria.

The interesting thing is that it is *"Freon"* that now comes to his aid. Twice in his lifetime, this one result of General Motors research is paying off in personal protection for him and his kind.

For when mixed with chemicals to kill mosquitoes, this compound makes a new and better kind of insect spray. Unlike heavier sprays that fall to the ground, it evaporates almost instantly, leaving the mosquito-killing compounds floating suspended in the air.

"Freon" was not developed as a war product. It came about because General Motors, seeking to provide more and better things for more people, never stopped trying to make better refrigerators for American households.

But because it was known and familiar, it was available when the war need appeared — just as it remains at hand for future peacetime developments.

The idea that built America — the idea that men accomplish most when they can win a just reward for doing great things — has served the country well in war.

And the same idea will keep on providing more and better things for more people in a world restored to lasting Peace.

*Trade-mark registered. "Freon" is made and sold by Kinetic Chemicals, Inc

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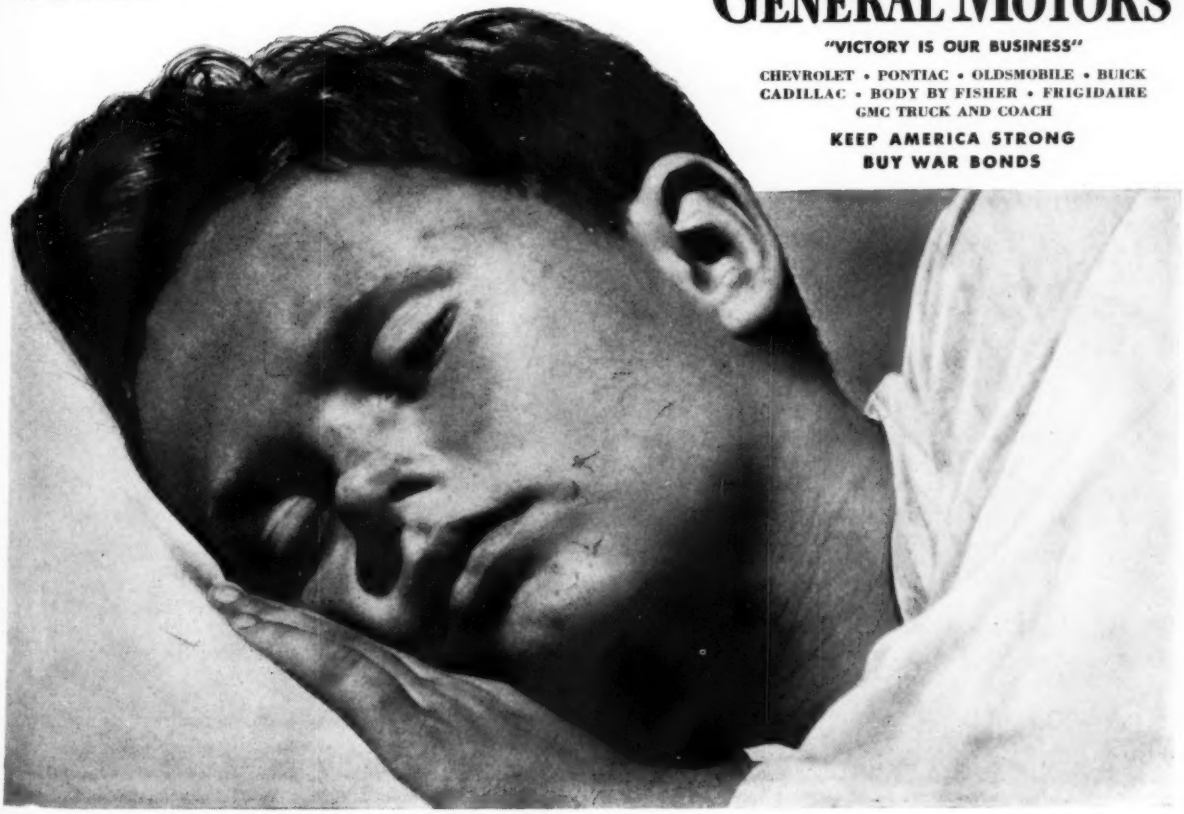

THE MOST COMPREHENSIVE BOOK

"Electrical Living in 194X"

Are you planning ahead for the *greatly increased electrical loads* that household appliances and equipment will bring in 194X?

To help you in your postwar planning, the Westinghouse Better Homes Department has prepared a new and unusual *free book* . . . that explains to prospective home owners the urgent need for *better wiring* in their future homes.

We are confident that you will find in "Electrical Living in 194X" a valuable tool for selling the idea of *better wiring for better living* to present and future home owners. Send for your copy *now!*

Westinghouse Better Homes Department offers new "Six-Point Advisory Service"

The Better Homes Department welcomes the opportunity of giving authentic technical information on the *proper applications of electricity* which will contribute so much to better living in 194X.

This Six-Point Advisory Service includes free advice on the following important subjects:

1. Selection of correct types of electrical equipment for various classes of postwar homes.
2. Location and arrangement of fixed equipment, for conserving space and attaining maximum efficiency in arrangement of kitchen and laundry work cycles.
3. Accurate dimensions and clearances of equipment to insure proper installation and efficient operation.
4. Access for servicing of equipment—so necessary for periodic inspection and repair.
5. Location of lighting outlets and controls, for greater enjoyment, comfort, and safety in the home.
6. Utility service connections—including location and size of electric wiring, water supply, and drainage lines.

If you have any problems relating to the selection, installation, and use of home electrical equipment, write: Better Homes Dept., Westinghouse Electric & Mfg. Company, Pittsburgh 30, Pa.

Tune in John Charles Thomas, NBC, Sundays, 2:30 p. m., E.W.T. and "Top of the Evening" Monday—Wednesday—Friday Blue Network, 10:15 p. m., E.W.T.

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FOR CLARITY, WE HAVE DIVIDED THE WORK INTO THESE MAJOR ELECTRIC CIRCUITS:
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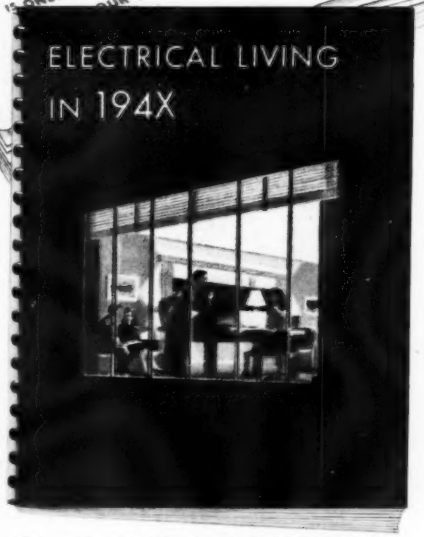
WIRING AND WIRING DEVICES OF HIGH QUALITY
AND, REMEMBER, THE EXTRA COST OF BETTER WIRING



This new book is offered to the building profession, and allied interests, as a contribution of the Westinghouse Better Homes Department to the greater enjoyment, comfort, and convenience of home owners in 194X.

New Free Book

tells all about

"BETTER WIRING FOR BETTER LIVING"

"Electrical Living in 194X" takes the prospect on a *personally conducted tour* through a completely electrified postwar home!

It pictures and describes the wiring circuits and electrical appliances in the home of the future . . . in kitchen, laundry, utility room, living and dining rooms, and bedrooms and bath.

This colorful, 64-page book tells all about electrical loads in the 194X home, lighting and lighting controls, circuit protecting devices, entrance equipment, and distribution panels.

"Electrical Living in 194X" also contains valuable technical information on the *application and installation* of fixed and portable electric home appliances.

"Electrical Living in 194X" will be ready for distribution soon. The supply is limited. Be sure to get your copy, by returning the coupon *today!*

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Please send my *free copy* of "Electrical Living in 194X"

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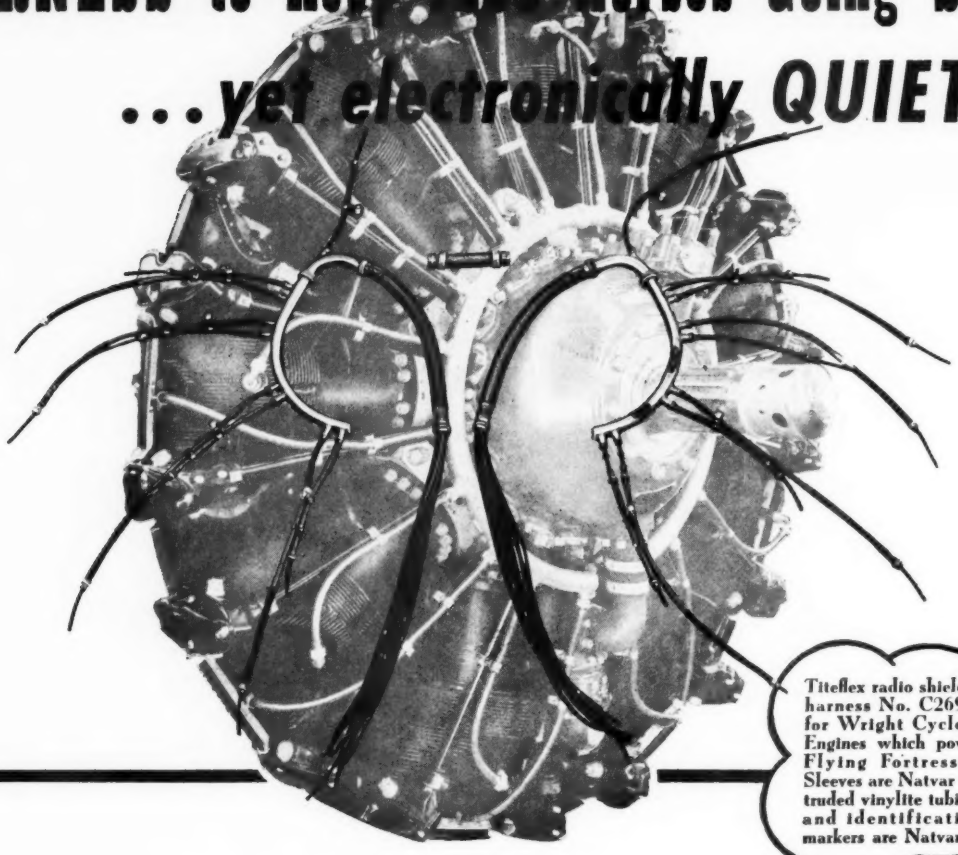
HARNESS to Keep 1200 Horses Going Strong

...yet electronically QUIETED!



Titeflex radio shielded harness No. C26980 for Wright Cyclone Engines which power Flying Fortresses. Sleeves are Natvar extruded vinylite tubing, and identification markers are Natvar.

Titeflex harnesses physically protect high tension ignition systems from magneto to plugs and, at the same time, shield vital lines of communication from the principal source of interference—the ignition system itself.

A tremendous job, when you stop to consider that these Titeflex harnesses perform in a wind stream of over 300 mph—with or without rain and ice, but always subject to vibration. And at temperatures ranging from 50°F. below zero up to 300°F. at the spark plug end!

We are proud of the fact that Natvar extruded vinylite tubings and identification markers are contributing to this performance.

What about *your* requirements? Write, wire, or phone us for deliveries either from nearby wholesaler's stock, or from our own.

Natvar

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NEWS of the INDUSTRY
National and Southern

Army and Navy Praises Utility Company Help

The assistance rendered by utility companies in the Southeast to the War and Navy Departments and to the Maritime Commission during the war was highly praised in Atlanta on March 2nd by Brig. Gen. J. S. Bragdon, Fourth Service Command Engineer in a prepared address given at the Utilities Wartime Aid Conference.

General Bragdon, whose address was delivered by his executive officer, Lt. Col. W. Z. Bancroft, asserted that "this is a tribute to free American enterprise accepting a responsibility and putting forth maximum effort to assist its Government in an unusual situation created by the greatest construction program this country has ever undertaken."

All construction for the War Department was assigned to the Corps of Engineers in December of 1941, the general pointed out, and since that time, he said, "I have seen constructed in this area some 150 airfields, 33 cantonments, 13 ordnance plants, 15 ordnance and general storage depots, and 10 general hospitals, together with scores of other special projects. I have seen a gigantic real estate program grow along with the construction program in the acquisition of land for the building program, warehouse space, and office space."

War Department installations in this command consume approximately 1,000,000,000 kilowatt hours of electricity, he said, and the fact that the utilities made the power available on time and in ample quantities was a material accomplishment.

Maj. General F. E. Uhl, commanding general, Fourth Service Command, also warmly praised the utility wartime aid program, declaring that the electrical utilities had created a "splendid agency for the type of cooperative planning that we need."

Discussing the future, General Uhl asserted, "The war is not over yet—not by a long shot. We are still on the fringe of the empire around the China Sea, and Hitler's fortress of Europe has not been reduced. The bitter struggle ahead will cause heavy drains upon our American manhood, and there will continue to be heavy demands upon our natural resources to aid our allies."

The general declared further that when the war is over and the story is told, "America's war effort will, I believe, go down in history as one of the great sagas of human accomplishments."

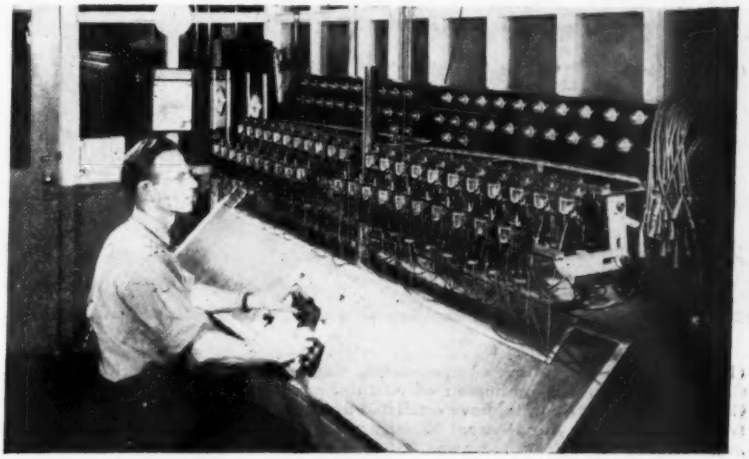
Wartime Plan Maintains Frigidaire Service

An all-out effort on the national service front is being waged by Frigidaire Division of General Motors to see that proper refrigeration is maintained in the homes and business places of its millions of users during the coming hot weather season. This admittedly ambitious plan was devised to prevent all possible food loss and interrupted refrigeration — a goal which is especially worthy of achievement throughout the present critical war period.

"There is certain to be a greater service demand than ever before," says P. V. Sprout, Frigidaire service manager, "as a result of increased refrigeration burdens, the inability to secure new products, and the steadily advancing age of present equipment.

"But we have taken steps to prepare ourselves to meet this expected service demand in the best manner possible. In fact, several months ago we devised a plan that is already helping our dealers to keep present servicemen at their vital work, during the winter season, and to find and train the hundreds of new men that will be needed for next summer's peak service demands.

"The activity in connection with this program, as reflected by the use of materials provided, is al-



A scene from Frigidaire's new 15-minute talking slide film, "The Story of Frigidaire Service" which was introduced at field meetings. Switches are here being checked and adjusted so that when installed they will turn on and off at the right temperature.

ready greater than our entire year's experience with the previous program which was considered quite successful."

Details of this program are described in a 28-page booklet, "A Wartime Plan for Maintaining Frigidaire Service," recently sent to dealers. Mr. Sprout points out two special features of this "Wartime Plan."

"First is a 10-page 'sales album' section incorporated in the plan book itself, which is used by our dealers when seeking to interest new men in becoming service employees. Strong headlines, simple text, and interesting illustrations are combined to show prospective new servicemen the general advantages of refrigeration work—both now and after the war—and the particular advantages of going into this work with a Frigidaire dealer. Reports from the field indicate that this 'sales section' is proving an invaluable aid in securing new men.

"Another feature of our 'Wartime Plan' is our new Primary Service Training Course. It is scientifically planned to give new men a valuable insight into the fundamentals of refrigeration service, as well as to give men even of considerable experience helpful 'refresher' instruction in their work. It is clearly written, well illustrated—and, thorough as it is, all 24 lessons may be completed in three months or less. The course may even be taken by a service applicant while still employed elsewhere. That is a big advantage, not only for the applicant himself, but also for the dealer, who has a chance to determine an applicant's aptitude before finally hiring him. After taking this course, the men are better prepared than otherwise to progress rapidly in regular training classes and from actual service experience."

Deep South Visited In G-E Talent Search

The South may be the land of opportunity for The General Electric "Hour of Charm" in its search for "The Undiscovered Voice of America." For the land below the Mason-Dixon Line is not only noted for the charm of its women, but for the sweetness of their voices as well.

Both these qualities will be considered in the selection of the woman to whom will be offered a contract to sing on The General Electric Company's "Hour of Charm", Sunday night radio program.

Although the final judging is still several months away, already three young women of the deep South have qualified. They are the Misses Mary C. Bruce and Evelyn Eddleman, of Atlanta, and Miss Georgette Clark, of Decatur, Georgia. All are members of Southern church choirs and have studied voice in their home towns.

To qualify the young women for the final judging, leading musicians of the principal cities of the South are cooperating. Auditions have been conducted in New Orleans, Atlanta, Birmingham, Dallas, Asheville, Charlotte, Chattanooga, Fort Worth, Houston, Louisville, Memphis, Raleigh, Richmond, Tampa, and many other places.

The country as a whole stands to benefit from the General Electric talent search. It is making a definite contribution to cultural America through a re-awakened interest in the musical arts inspired by the quest for this new radio voice.

The rules for participation in the search were broad. Any woman singer over 18 years of age, a non-professional (meaning one not earning her living by singing), was eligible. The time for filing entries expired midnight of February 13.

The response was far beyond the most optimistic expectations of General Electric's executives. More than 16,000 requests for auditions

(*Continued on page 42*)

(Left) The three young women seated, the Misses Mary C. Bruce and Evelyn Eddleman of Atlanta, and Georgette Clark of Decatur, Georgia, have qualified as representatives from the South in the General Electric "Hour of Charm" auditions — a search for the "Undiscovered Voice of America." Standing left to right are M. E. Olson, G-E Lamp Department, Atlanta; the Atlanta audition judges, Mr. Ernest Rogers, Dr. Malcolm Dewey, Joy Ruth Adams, and Mr. John D. Hoffman; and T. W. Moore, manager of the G-E Lamp Department's Southeastern District.

(Right) Shown here with the judges in the Houston, Texas, "Hour of Charm" auditions are two of the four finalists. At the left, LaVerne Walden, school teacher at Bryan, Texas; and third from left, Edwina Akin, of Houston. The judges are, second from left, Ray Herndon, of Station KPRC, Houston; fourth from left, Mrs. Milla Dominguez, wife of the Mexican consul; and at the right, Hamilton Phillips, radio executive of Gano-Wilhelm and Laughlin, advertising agency in Houston.

NO OTHER SWITCH HAS THESE TWO GREAT FEATURES

INSIDE—*note the trim compactness and ample wiring space.*

OUTSIDE — *modernly streamlined cover with rocker design handle.*

All BullDog Safety Switches have two important (and exclusive) advantages which assure more positive action, greater safety and longer life.

First, the Vacu-Break principle gives arcs no space in which to breathe — snuffs them out before they start.

Second, the Clampmatic mechanism — bolt-tight in the ON position—makes possible an easy, quick release when thrown OFF. This is accomplished by the energy stored in the clamp springs which help the handle operating spring "break" the contacts with almost automatic ease.

Send for descriptive Bulletin No. 415, giving complete information.

BULLDOG

ELECTRIC PRODUCTS CO.

BOX 177, R. PK. ANNEX
DETROIT 32, MICHIGAN
BullDog Electric Products of Canada, Ltd., Toronto, Ont.

Field Engineering Offices in All Principal Cities

ALSO MANUFACTURERS OF

SAFTOFUSE PANELBOARDS • SWITCHBOARDS • CIRCUIT MASTER BREAKERS • BUSTRIBUTION DUCT, *for "plug-in" power* **• UNIVERSAL TROL-E-DUCT,** *for flexible lighting* **• INDUSTRIAL TROL-E-DUCT,** *for movable "loads."*

BUY MORE WAR BONDS

Thousands Plan New Homes

ELECTRIC **Hotpoint** KITCHEN

...with All-Electric Kitchens

HOTPOINT'S SUCCESSFUL "BOND WAGON" DRIVE Gives Proof

WIDESPREAD interest both in home building and in electric kitchens is shown by returns from Hotpoint's national advertising campaign, which for the past two years has featured: "Buy War Bonds Today—Electric Kitchens Tomorrow." This is your Bond Wagon too. Climb on!

Thousands Wrote for Home Planning Files. The "Home Planning File," offered for 25¢ in Hotpoint national magazine advertisements brought thousands of letters. Nearly all the writers plan to build new homes after the war—and they want Hotpoint Electric Kitchens.

Think What This Means to You. These thousands who plan to build new homes with electric kitchens are your future customers. They give you a big stake in the postwar business picture. As a result of the good will built by our War Bond advertising program, Hotpoint's franchise with the public is stronger—more secure than ever.

More Electric Kitchen Advertising for 1944. Naturally, with such results, Hotpoint's advertising for 1944 will further develop this successful theme. Keyed to the tempo of today, Hotpoint's new advertising program will provide more specific information for those thousands who are now planning new homes with Electric Kitchens. And remember that this campaign is doing a job for you. Take advantage of it in every way you can, preparing for the happy day when Hotpoint equipment will again be available for civilian use.

Edison General Electric Appliance Co., Inc.
5614 West Taylor Street, Chicago 44, Illinois

MORE HELP FOR YOU

As a result of the tremendous interest in home planning and electric kitchens, Hotpoint now has in preparation a book to help home builders and modernizers plan the truly modern kitchen. It is entitled "Your Next Kitchen." Watch for announcement of publication.

BETTER CARE
Conserve Electric Servants
LESS REPAIR

were received at the Nela Park headquarters of the Company. Of this number 9,813 qualified to be heard at one of the 92 audition centers which were spotted about the country.

Recordings of the voices of those judged best in each center have been forwarded to Phil Spitalny and the members of his all-girl "Hour of Charm" orchestra for elimination judging.

The girls whose voices are rated best by the orchestra will be summoned to New York for a personal appearance on the program and will be heard through succeeding Sunday nights of April and May.

For this appearance General Electric will pay each girl $100 plus traveling and living expenses to and from the origin of the broadcast of both herself and chaperone.

A climax will be reached when three of these girls are heard on a single broadcast of the Hour of Charm early in June preliminary to determining the final choice. The radio audience as well as Mr. Spitalny and his orchestra will be given the opportunity to participate in this selection through a mail poll.

Westinghouse Launches 1944 Conservice Schools

More than 10,000 appliance service men and women throughout the nation will receive specialized training during the Westinghouse "Conservice" schools this year, according to an announcement by L. K. Baxter, manager of the Service Department of the Company's Appliance Division.

"The 1944 schools incorporate a number of new training techniques based on needs disclosed by a nationwide survey," Mr. Baxter said. "For one thing, the survey showed that more work projects were needed to teach new service people how to make appliance repairs. Since ranges, refrigerators, ironers, washing machines and other appliances are not available, we decided to simulate the products with operational demonstration boards electrically wired and equipped with actual working parts."

To illustrate, the refrigeration demonstration board is designed so that a service man can see how a refrigerator mechanical unit works. The board is equipped with a compressor, transparent plastic evaporator connected to a float valve and a fan-cooled condenser or to an impedance tube and a plate type condenser. Thus the two types of refrigerator systems manufactured by Westinghouse can be explained and demonstrated.

Designed to simulate what goes on inside a refrigerator, this device will be used in training thousands of new service men and women attending the 1944 Westinghouse "Conservice" schools. L. K. Baxter, manager of the Service Department of the company's Electric Appliance Division, is shown pointing out the controls of the operational demonstration board to J. H. Ashbaugh, division manager.

Mr. Baxter pointed out that this operational demonstration board is not simply a display, but is a working model that produces refrigeration. Actual parts in cut-away form are used so that service trainees can see what happens inside the mechanisms of refrigerators. Refrigerant can be seen moving inside the transparent plastic evaporator, and the effect of condensation is shown through sight tubes in the two condensers.

"One of the most important points about the demonstration board from a training standpoint," Mr. Baxter declared, "is that the refrigerator troubles can be created so that the service class sees both the effect and cure." By use of solenoid valves and other devices the instructor can simulate floats stuck open or closed, shortage of gas, leaky valves and other conditions that require replacement or adjustment.

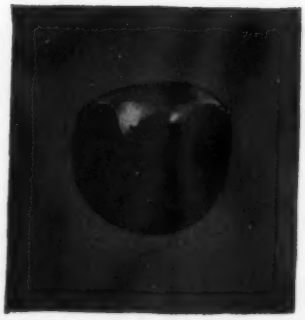
Several temperature controls are assembled on the board—each having a different trouble. These troubles are discussed and students are trained to make adjustments for correction.

The range operational demonstration board consists of a complete wiring circuit, and is so designed that troubles can be set up, enabling the instructor to point out how to make the proper repairs. Special lighting effects are used to indicate how electricity provides various heats for the surface units. All types of switches and oven thermostats used by Westinghouse are installed on the board.

Another innovation in the 1944 Westinghouse Conservice schools is the trouble diagnosis chart which lists the steps to be followed in checking the various appliance troubles. There are 17 charts pertaining to refrigerators, 27 on ranges, 19 on washers and ironers, 22 on heating appliances, 14 on fans and 16 on vacuum cleaners.

NEWA Opens Membership To Specialty Distributors

The Committee of the National Electrical Wholesalers Association charged with the responsibility of creating a special plan for inviting and admitting to membership in N. E. W. A. wholesalers who distribute for resale — refrigerators and other electrical refrigeration equipment — electric heating and cooking units—all socket appliances, including radios and phonographs, etc.—and all electric farm equip-



The torch bows out. Today, small wires are terminated or linked together simply by *Indenting* the connector to the wire with the Burndy HY-TOOL. Speedy and simple . . . *for no torch, no fuel, no acid are necessary.*

But the *big* feature is that simple Indenting *eliminates faulty connections.* Note the cross-sectional view at the left . . . showing how connector and conductor have been *permanently joined* by indenting with the HYTOOL. *The connection is on to stay!*

It's a better electrical conductor, too; since the Burndy HYDENT connectors used are of one-piece, pure copper construction. *No seams or joints to loosen, or increase resistance!*

Why not have the complete story on this modern connecting method at your fingertips. The Burndy HYDENT Catalog, available on request, gives complete details.

Headquarters for connectors

Burndy

BURNDY ENGINEERING CO., INC.
107 EASTERN BOULEVARD, NEW YORK 54, N. Y.
IN CANADA: Canadian Line Materials, Limited, 13

ment announces a special plan of interest to all appliance and radio wholesalers.

Such prospective members will be admitted for the present as "Special Members". The idea is to get as many such members as possible to join now—and before April 19-22, 1944, which are the dates of N. E. W. A.'s Thirty-sixth Annual Convention and Second War Conference to be held at The Stevens, Chicago, Illinois—so that they may be represented there in force and attend the special meetings with special programs arranged just for them. One very important item on the agenda for the Chicago Convention will be the creation of a special Electrical Appliance Distributors Division, which will deal with problems peculiar to that branch of the electrical wholesaling industry. It is planned that representation on the executive committee of N. E. W. A. will come from the appliance division as well.

Special members' dues are very moderate. Interested electrical appliance distributors, Chas. G. Pyle, managing director, advises, are urged to get in touch with him at N. E. W. A.'s headquarters, 500 Fifth Avenue, New York 18, New York.

Hotpoint Bulletins Issued On Planned Merchandising

More than 14,500 retailers have applied for monthly mailings of "Planned Electrical Merchandising," a study of retailing principles aimed at postwar conditions, since the bulletins were first announced in December, according to G. H. Smith, general sales manager, Edison General Electric Appliance Co., Inc., makers of Hotpoint electric appliances.

"The study upon which the bulletins are based includes retailing fundamentals for all lines of business," Mr. Smith said. "Starting with the first bulletin which sums up a discussion of a good store location by listing 23 rules which should be followed in selection, hundreds of facts have been assembled to show how and why given practice must be followed to succeed.

"This is not a study of Hotpoint's business, nor do we mention our policies or products in the bulletins. The material deals with basic retailing procedure which

G. H. Smith, general sales manager, Edison General Electric Appliance Company, Inc., Chicago.

must be followed by retailers, if they are successfully to meet highly specialized competition after the war," Mr. Smith said. "We retained the best retailing authority to prepare these demonstrations of how to sell, display and advertise. Thousands of personal contacts and years of study are behind every fact presented, and an effort has been made to reduce retailing generalities to simple rules of action."

The first six subjects in the series announced are:

1. Plan Now for the Appliance Store that Will Help You Sell;
2. How to Choose a Good Location for an Appliance Store;
3. Planning Your Type of Business;
4. How Customers Know Appliance Stores;
5. Floor Arrangements Which Help You Sell;
6. Advertising Brings Them into the Store.

Dealers not receiving the series are asked to write to the company. They will receive bulletin No. 1 the first month, and the others in succeeding months.

Typical of the specialized information presented is the discussion of store location in bulletin No. 2, in which definite rules are laid down for all sizes and types of town. "Store traffic" and facts about customers are discussed.

Bulletin No. 3 explains how customers "see" appliances. Most customers have little idea of an appliance "field." They think of appliances only by function, and these functions can be divided into five groups which seem natural to customers. The place of television in merchandising is discussed in this bulletin.

New Electrical Dealer Chartered in Virginia

The Virginia State Corporation Commission has issued a charter to the S. C. E. Electric Corporation, Covington, Va., "to do a general wholesale and retail mercantile business." Maximum capital of the firm is $15,000 and Albert Smith, Jr. is president.

James Hill (center) president of the Arkansas-Missouri Power Company, Blytheville, Arkansas, is firing trainer piece while W. F. Ogden (left) Hotpoint engineer, and C. M. Turner, of Ebasco Service, look on. While Mr. Hill and Mr. Turner visited Edison General Electric Appliance Company to discuss equipment to meet wartime demands, they took great interest in the war equipment, to which the Hotpoint plant is 100% devoted.

Advertising YOU!

POST
Journal
GOOD HOUSEKEEPING
A Word from the Wise
YOURTOWN ELECTRIC SHOP
The Best in Home Appliances
...about post-war Premier cleaners!
HERE'S WISE, your electrical appliance dealer, on the comparative values of vacuum cleaners—their standards of actual performance and their relative dollar-for-dollar worth. You've seen for yourself in these war years how well he's done his job of keeping your old cleaner on active duty through careful servicing and reconditioning. He knows from experience a good cleaner when he sees it—because he recognizes the fine manufacturing that has made it good. That's why his advice is going to prove doubly valuable to you when the time comes once again to buy a new vacuum cleaner.
Today, of course, you can't get a new Premier—we're busy building a number of critically important things for immediate export to Japan and Germany. But you can start your post-war purchase-planning today, and the first thing to do is to discuss your needs with your electrical dealer.
He'll tell you frankly there won't be enough new Premier cleaners right at the start to go around—but that they'll be worth waiting for! At the same time he'll tell you about Premier's post-war distribution plans which are going to mean a saving to you—and he'll surely tell you that highest quality in any Premier is as certain as Victory!
If your foresight is "20/20", you'll take your dealer's tip now—just say to him, "Put me down for a post-war Premier!"
Every War Bond you buy brings the post-war era closer
PREMIER
DIVISION
ELECTRIC VACUUM CLEANER CO., INC. • CLEVELAND 10, OHIO

PREMIER'S spring advertising to thirty-five million readers of the Ladies' Home Journal, Good Housekeeping, and The Saturday Evening Post has one primary purpose — to sell YOU to your present and prospective customers.

Naturally we hope these ads will also help to sell a lot of Premier Vacuum Cleaners when we are given the "green light." But today the "product" we're selling is the service you offer your customers.

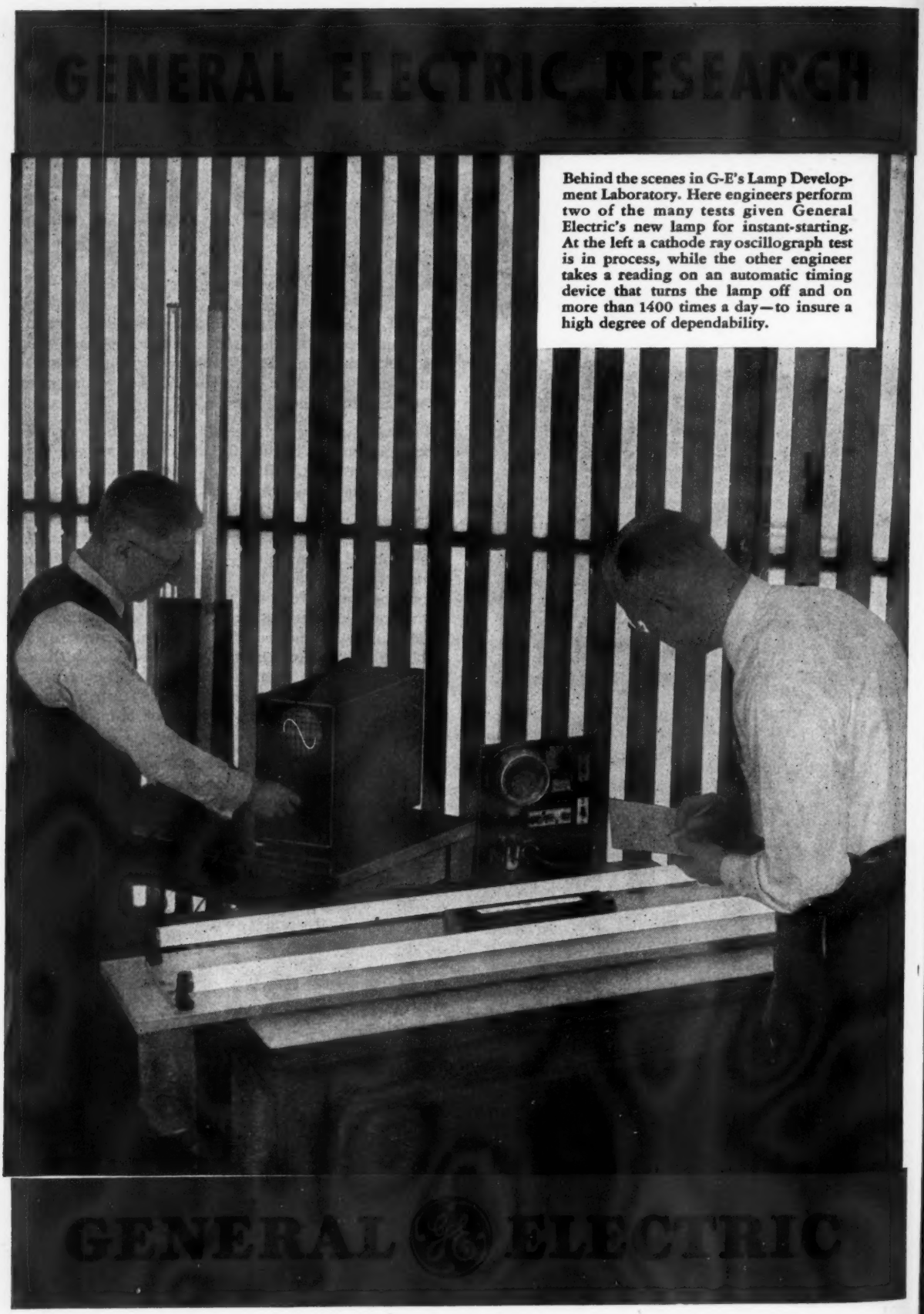
Premier is urging them to keep their present cleaners fit for active duty by having them repaired and reconditioned by an expert—YOU! But, even more important in the long run, Premier is also encouraging your customers to come to you now to discuss their post-war purchase-planning. As an expert who knows the quality, standard of performance and relative dollar-for-dollar worth of any cleaner, you're the one whose advice on post-war buying will be respected. These foresighted customers will, in turn, be helping you by giving you a pre-view of their electrical appliance needs.

We've suggested to your customers that they say to you, "Put me down for a post-war Premier!" We suggest that you say to them, "Count on me to keep your present cleaner on the job until it can be replaced."

The ad at the left appears in:
Ladies' Home Journal ..... May Issue
Good Housekeeping ..... June Issue

PREMIER
DIVISION
ELECTRIC VACUUM CLEANER CO., INC. • CLEVELAND 10, OHIO

GUARANTEED
CERTIFIED SERVICE
For Vacuum Cleaners


GENERAL ELECTRIC RESEARCH
Behind the scenes in G-E's Lamp Development Laboratory. Here engineers perform two of the many tests given General Electric's new lamp for instant-starting. At the left a cathode ray oscillograph test is in process, while the other engineer takes a reading on an automatic timing device that turns the lamp off and on more than 1400 times a day—to insure a high degree of dependability.
GENERAL ELECTRIC

DEVELOPS FLUORESCENT LAMP For INSTANT-STARTING!

New General Electric 40-watt Fluorescent Lamp Starts Instantly and Positively

Here is fluorescent lighting—at the flick of a switch! A fluorescent lamp that starts as instantaneously as an incandescent lamp!

General Electric soon will make available a 40-watt white G-E Mazda fluorescent lamp for operation with instant-starting ballasts. Shipments in limited quantities will start May 1st. New General Electric instant-starting ballasts will be made available at the same time by G-E's Transformer Section in Ft. Wayne.

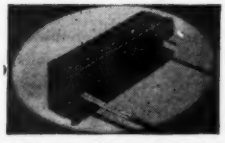
Instant-starting can be obtained with regular fluorescent lamps when used with an instant-starting ballast, but only at the cost of a substantial reduction in lamp life. The new 40-watt G-E fluorescent lamp operates on instant-starting ballasts *without sacrifice of rated lamp life.* It will sell for the same price as regular 40-watt G-E Mazda fluorescent lamps.

The new lamp, operating with a high voltage instant-starting ballast, eliminates the need for conventional starters. However, under abnormal operating conditions, such as high humidity, special provision may be needed to assure starting.

Another Example of G-E Leadership in Lighting

The development of the new fluorescent lamp for instant-starting is just one more example of the never-ending lighting progress led by General Electric lamp research. Through this research is assured the uniform quality and dependability that are characteristic of the complete line of General Electric Mazda lamps.

G-E High Voltage Ballast for Instant-Starting



Latest development in the G-E Specialty Transformer laboratories at Fort Wayne is the new type ballast for use with instant-starting fluorescent lamps. Available in limited quantities about May 1st in four voltages with end out or base out leads. Rated life of the new fluorescent lamps when used with these ballasts is the same as that of regular G-E Mazda F lamps using the conventional switch and starter.

Hear the General Electric radio programs: "The G-E All-Girl Orchestra," Sunday 10 p. m. EWT, NBC; "The World Today" news, every weekday 6:45 p. m. EWT, CBS.

THE BEST INVESTMENT IN THE WORLD IS IN THIS COUNTRY'S FUTURE
—BUY WAR BONDS

"TO MAKE LAMPS STAY BRIGHTER LONGER"
The Creed of G-E RESEARCH

G-E MAZDA LAMPS

Postwar Appliance Sales Estimated in Survey

Westinghouse Electric & Manufacturing Co's. Appliance division at Mansfield, Ohio, is at work on plans to capture a share of the postwar appliance business.

The company has set up a planning committee of six distributors and three factory executives. One of the major projects of this committee is a comprehensive survey of the appliance field. In this survey the sales possibilities of 13 different appliances were studied. Using the average of the 1940 and 1941 peak years as a base, an estimate of the possible sales trend was reached.

On the basis of this estimate, Westinghouse has arrived at the conclusion that appliance sales in the postwar period will be 78% over the averages of the peak years.

For the purposes of the survey Westinghouse defined the postwar period as being the first five years after industry is freed of wartime Government restrictions and the limitations of materials shortages.

The increase in sales of individual appliances was estimated as follows:

Refrigerators, 48%; ranges, 72%; water heaters, 118%; washers, 97%; ironers, 183%; fans, 29%; vacuum cleaners, 67%; small air conditioners, 138%; roasters, 36%; hand irons, 58%; water coolers, 22%; dishwashers, 818%; miscellaneous appliances, 66%.

Another policy that has been decided upon by this manufacturer, is that there will be fewer and better dealers in the postwar sales organization. Under this policy, each of these dealers will be assured the maximum of profits and sales in his own market area.

Universal Customer Service Department Reorganized

Landers, Frary & Clark, manufacturers of Universal electrical appliances and housewares recently announced plans for re-organizing the Customer Service Department to more effectively handle wartime service problems and to extend additional assistance to consumers of Universal products after the war.

H. M. Stack, former manager of the replacement parts department, will supervise the activities of this new department assisted by E. H. Prior, in charge of the Repair Division, and Adolph Zering, of the Renewal Parts Division.

The new arrangmeent provides for the fulfillment of all necessary functions to render customers prompt and efficient service. This includes the problem of maintaining adequate stocks of both current and obsolete parts; establishment of facilities for handling factory repairs promptly and at a nominal cost to the consumer; the preparation and maintenance of parts price lists; preparation and dissemination of repair instructions and manuals with a complete program of information to dealers so that they can accomplish repairs in the field more effectively.

Another function of the Customer Service Department will be the supervision of general activities of the Service Stations both company owned and independent, including general supervision over stocks of parts carried, methods of repairing, free service adjustment, etc.

Since the beginning of the war Universal has done everything possible to provide adequate parts and repair facilities for products it manufactured, and while this has not been an easy task, shipment of orders and prompt service to all sections of the country reflects the continued support and co-operation being extended by Landers, Frary & Clark to dealers.

---

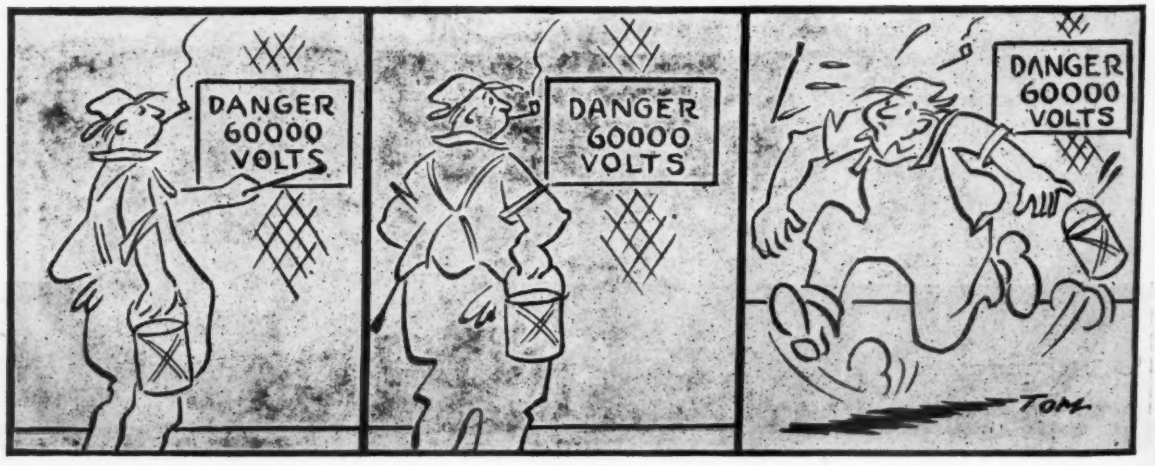
800 Miles Rural Lines Planned By Georgia Power

A million-dollar program for the construction of 800 miles of rural electric lines to serve more than 3,400 farm homes is being planned by the Georgia Power Company, President P. S. Arkwright announced recently.

Of the 800 miles of new lines, it is hoped that 510 miles, serving 2,400 farms, can be constructed during 1944. The remaining 290 miles will be built as soon as conditions permit.

Approval of the War Production Board for each of the various projects will be required before it can be undertaken. Copper, aluminum and other critical materials are needed for the construction of electric lines and their use is sharply limited, Arkwright said.

The WPB, in authorizing new rural lines, gives preference to those which will contribute most toward increasing the nation's food supply. Arkwright expressed the hope that the 510 miles of new lines scheduled for construction in 1944 will be regarded as essential.



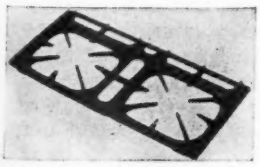
NON-CLOG TOP BURNERS . . . of exceptionally high efficiency and economy; porcelain finished. Flame adjustable to any size utensil.

OVEN BURNER . . . operates on low heat and holds very low flame for slow cooking. Uniformity of heat results in perfect baking and roasting.

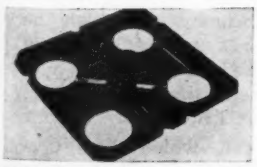
EASY-CLEAN OVEN . . . has smooth, one-piece interior of porcelain enamel. Rounded corners. Rack guides integral with oven lining.

ROCK WOOL INSULATION . . . on sides, back, doors and top. Results in efficient oven heat, keeps kitchen cool.

SLIDE-OUT, DROP-FRONT BROILER . . . makes it easy to watch and control broiler. Gravy well in drip pan.



TOP GRATES . . . built in two sections for easy removal and cleaning. Finished in black porcelain enamel.



ONE-PIECE DRIP PAN . . . fits tight around burners, catching any spillovers. Easy-to-clean black porcelain enamel finish.

Ready Now for Norge Dealers!

New Norge gas range (model GW-024) is *not* a makeshift or tide-over "Victory" model—it is full-quality merchandise, built as it will be built after the war, and is now available to Norge dealers in limited quantities!

We repeat: Here is a full-quality gas range, built of highest-grade heavy materials and to Norge precision standards. It definitely is *not* a tide-over "Victory" model, but is a permanent postwar product.

Check These Features

Special white vitreous porcelain exterior; non-clog top burners; automatic top burner lighter; low-heat oven burner; one-piece porcelain enamel drip pan; one-piece tank-type oven and broiler lining, each porcelain enameled; safety oven lighter; slide-out, drop-front broiler; full rock wool insulation; black recessed base; black plastic hardware.

The Norge model GW-024 range is adaptable to the use of bottled gas as well as artificial and natural gases (ask about model BGW-024). Norge distributors have complete specifications and prices.

"SEE NORGE BEFORE YOU BUY"

"... for outstanding production of war material."

NORGE

A BORG-WARNER INDUSTRY

NORGE DIVISION, BORG-WARNER CORPORATION, 670 EAST WOODBRIDGE ST., DETROIT 26, MICHIGAN

***Only prewar producer of a complete line of* ROLLATOR REFRIGERATORS ★ ELECTRIC RANGES ★ WASHERS ★ GAS RANGES ★ HOME HEATERS ★ COMMERCIAL REFRIGERATION**

Bomb Fuses Contract Kept Secret Two Years

George W. Mason, president of Nash-Kelvinator Corporation reported that the company recently completed "on schedule" a Navy contract calling for "great quantities" of bomb fuses. Acting under strict military censorship, the company's Detroit plant first began assembly line production in March 1942 and became one of the country's largest manufacturers of bomb fuses, according to the Navy approved statement.

Since then it has been producing three types of fuses for Navy bombs ranging from 100 pounders up to Atoll-Buster size. Manufacture of bomb fuses during the past twenty-two months, has been proceeding concurrent with Nash-Kelvinator's mass production of 2000 HP aircraft engines, hydromatic propellers, propeller governors, and manufacture of essential parts for jeeps, seeps, tanks, trucks and trailers, plus parts for submarines and Liberty ships. The company said all of these other operations continue in force.

The Navy bomb fuses, of the types made by Nash-Kelvinator, are delicate automatic instruments designed to detonate bombs after release over the target; moreover they are wired to protect aircraft crews from premature explosions while loading and flying bombs to enemy positions.

The fuses, none of which have been seen by the public, established an outstanding record for being safe from risk until they begin to fall. Then a tiny metal propeller starts whirling and after dropping about 500 feet it unscrews the mechanism so that a plunger falls into firing position. When the bomb hits the target, this plunger is forced back and the bomb explodes. To prevent the little fuse propellers from whirling inside the plane, it is locked with wire tied to a bomb clamp. Upon release of the bomb the wire slips from the propeller and it begins to whirl in descent. The larger size Navy bombs carry two of these propeller-type fuses to make doubly sure a bomb will explode—one in the nose and one in the tail. None of the propeller-fuse equipped bombs has ever been known to fall on the target a "dud".

In the same report, Mason also revealed that a Nesh-Kelvinator subsidiary, Electromaster, Inc., manufactured the incendiaries which Major Doolittle personally delivered on his famous preliminary mission to Tokyo.

Florida Graybar Branch Named Crosley Distributor

The Graybar Electric Company, Inc., has been appointed as distributor for The Crosley Corporation in the state of Florida, it was announced recently by J. H. Rasmussen, commercial manager of The Crosley Corporation.

The new Crosley distributor is one of the branches of the Graybar Electric Company, Inc., whose executive offices are located at 420 Lexington Avenue, New York City. It is one of 86 branches in the principal cities of the United States.

L. G. Fields

L. G. Fields, Peninsular district manager, is in charge of the district office at Jacksonville, Florida with branches in Miami, Tampa and Orlando, Florida.

Southwestern Contractors Meet at Fort Worth

(*Continued from page 23*)

Scholibo concluded that the present is ideal "while the industry is marking time, to make every possible effort to work out a smooth functioning plan of co-operation between the wholesale distributors and the electrical contracting industry and if we can approach these problems with an open mind, then such a solution can be quickly reached.

W. C. Bryant, Dallas chapter manager, estimated that government warehouses in New Mexico, Texas, Arkansas, and Oklahoma contain electrical material worth $1,250,000 and declared it to be the concensus in the electrical business that such stocks constitute "a dire threat to the maintenance of normal operations and relationships between manufacturers, distributors, contractors, and consumers."

Bryant would not agree with one authoritative opinion that such material should be shipped abroad as lend-lease, but on the contrary recommended that "the electrical contracting industry buy all of the standard, useable electrical material now in the hands of the government at the best bargain price we can promote." He added:

"There will be those contractors who say the volume of this material will be so large and the cost so great even if bought at a bargain that contractors will not be able to finance the purchase. Our banks are bulging with money, and the banker is now chasing us to loan us a dollar even on a questionable collateral. Certainly a contractor is sufficiently intelligent to buy this material at a price for which he can turn it and make a reasonable profit even under adverse conditions. Other solutions to this problem have been offered, but they are not workable or feasible."

Temple Wheeler, who outlined the legislative program, added state licensing of contractors and journeymen and state inspection to the previously made point of eliminating utilities from the appliance field.

In the joint and concluding session bringing together contractors and representatives of the I. B. E. W., H. L. Scott, contractor of Corpus Christi, Texas, said that in the mass production of prefabricated houses to come, "we cannot expect to prevent wiring of these houses by the manufacturer," but that there was every indication the big manufacturers would use I. B. E. W.

Lewis Ingram, international vice president, I. B. E. W., of Fort Worth, addressed the convention on the annual income basis which the I.B.E.W. hopes to establish and G. X. Baxter, international vice president, from Birmingham, Ala., also spoke for I.B.E.W.

The sessions, which were presided over by Cliff White, Fort Worth chapter president, were held in the Blackstone Hotel.

Regulations Affecting Electrical Industry

Restrictions on the use of metals in industrial type incandescent lighting fixtures were removed from the order covering these fixtures and metal restriction on residential types of incandescent lighting fixtures were relaxed by the War Production Board recently.

These changes are made by Order L-212 as amended, which is a complete revision of the order originally issued in March, 1943. The order covers the three types of fixtures known as industrial, utility, and residential.

Under the terms of the order as amended today, the sale of industrial and utility fixtures, is limited to purchase orders bearing preference ratings of AA-5, or better. For both types, however, purchase orders with lower ratings assigned prior to March 15 may be filled.

For utility fixtures, restrictions on the diameters of the canopy and globe holder have been removed. Certain types of utility fixtures may be manufactured only on specific WPB authorization, for which application is filed in Washington.

Metal restrictions on residential type fixtures have been eased to the extent that 12 ounces of metal may now be used for a ceiling type fixture and an additional 8 ounces of metal may be used for the chain or stem of a suspended type fixture. The previous order prohibited use of more than 6 ounces of ferrous metal. As in the original order, there are no restrictions on sales.

* * *

Several minor clarification changes have been made in the commercial cooking and food and plate warming equipment order L-182, and the commercial dishwashers order L-248, the War Production Board announced in March.

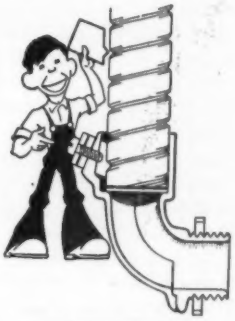
The following changes were made in both orders:

1. Applications for authorization to make or to accept delivery of commercial cooking and food and plate warming equipment or commercial dishwashing equipment must now be made on WPB Form 1319. Applications previously were made on WPB Form 1529. All applications should still be sent to the Plumbing and Heating Division, WPB, in Washington and not to WPB field offices.

T&B TITE-BITE CONNECTORS
Especially Designed for ARMORED CABLE

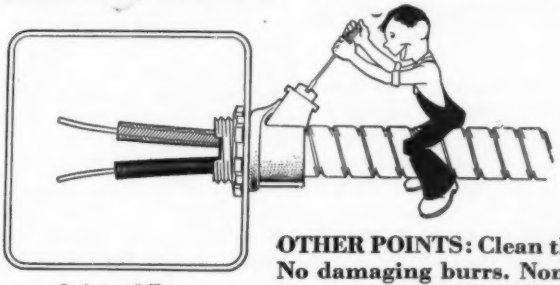
T & B Tite-Bites insure safe and speedy installations. They are tailor-made for work on all sizes of armored cable and flexible metallic conduit. Each connector takes several sizes. A small stock is all you need. Tite-Bites are particularly recommended for use in locations where vibration is constant. They're built to take it.

Note that the driving screw forces the teeth of the Tite-Bite onto the convolutions of the armor of the cable without spreading or injuring them in any way. The screw never touches the cable. Because the biting wedge is set at an angle, the harder the pull, the tighter the grip.



The Teeth Make a Tite-Bite.

Tite-Bite Connectors are available in both Straight and Angle types.



Safe and Fast Installation.

OTHER POINTS: Clean throats. No damaging burrs. Non-fumble screw heads. Precision sharp screw threads. Tite-Bites have full salvage value. Approved.

Order Tite-Bite Connectors from the stock of your local T & B Distributor through whom we distribute all our products exclusively. Because he reduces the manufacturer's selling costs, the distributor thereby reduces the cost of all electrical material to the user. Call on his organization for quick and competent service.

WRITE TODAY FOR TITE-BITE BULLETIN 15

THE THOMAS & BETTS CO.
INCORPORATED
MANUFACTURERS OF ELECTRICAL FITTINGS SINCE 1899
ELIZABETH 1, NEW JERSEY
In Canada: Thomas & Betts Ltd. Montreal.
E Flag awarded April 1943
White Star awarded October 1943

2. Appeals from the provisions of either of these orders should be filed on WPB Form 1477 (formerly PD-500) with local WPB field offices. Formerly, appeals were made in letter form to the Plumbing and Heating Division, WPB, in Washington.

3. These orders and all transactions affected by them were made subject to all applicable provisions of all regulations of the WPB instead of just to all applicable provisions of all the Priorities Regulations of WPB, as was specified in the previous orders.

* * *

Repair shops may use the AA-3 preference rating assigned them by Controlled Materials Plan Regulation 9-A to obtain fractional horspower motors from dealers, wholesalers or motors agencies, the War Production Board has ruled.

The AA-3 rating of CMP regulation 9-A was assigned on November 25, 1943, to electricians, plumbers, motor rewinders, electrical contractors, carpenters, blacksmith shops and farm machinery, radio, refrigeration, boiler, automotive, upholstery and bicycle repair shops to enable them to obtain more readily parts and materials for their operations, WPB explained.

Any dealer, wholesaler, or motor agency having fractional horsepower motor for sale is required to honor the AA-3 rating from repair shops if the motors in stock are not needed to fill orders bearing better preference ratings.

Any seller who fails or refuses to accept an order bearing a preference rating may be required, upon written request of the person placing the order, to give his reasons in writing for such failure or refusal.

Since the demand for fractional horsepower motors for combat services is unusually large, it is necessary to restrict their sale to essential purposes. For this reason, only those fractional horsepower motors needed to replace broken-down motors may be sold without a rating, and these replaced motors must be taken in exchange to be repaired where practicable and to be resold under similar conditions. Motors for any other purpose may be sold only on orders bearing a preference rating.

PERSONAL NOTES
About Men You Know

J. T. Nee, formerly Hotpoint's War Housing installation supervisor for the southeastern area, has been appointed Atlanta district sales manager, according to **G. H. Smith,** general sales manager, Edison General Electric Appliance Co., Inc.

J. T. Nee

Mr. Nee is serving his 26th year with the Hotpoint organization, having joined the service department of the firm in 1918. Since 1919 he has been in the southern area as commercial cooking service supervisor, electric range sales representative, and commercial cooking sales manager, successively. Immediately before the war, he was Atlanta district range sales specialist.

* * *

Henry Burwell, of Atlanta, Georgia, representative for Solar Manufacturing Corporation and other companies in Southern states for many years, is now a Major in the Signal Corps connected with the Army Service Force. Ever since Major Burwell entered the armed services eighteen months ago, his business activities have been carried on by his wife, **Mrs. Abby Burwell.** She not only continues to maintain his office at 105 Forrest Avenue, in Atlanta, but at the same time, is keeping in contact with the trade and otherwise carrying on for the duration.

J. L. Phillips succeeds **Carroll E. Cook,** deceased, electrical engineer with J. M. Clayton Company, contracting electrical engineers, Atlanta, Ga., according to announcement by **J. E. Mellett,** president.

Mr. Phillips, a graduate of Georgia School of Technology in General Engineering, was formerly affiliated with the Georgia Power Company, Allied Engineers, Inc., Alabama Power Company, and the Rust Engineering Company.

Immediately before joining the Clayton organization, he was project manager for Juneman Electric Company, in charge of the construction of the complete electrical system for the Huntsville Arsenal and Redstone Ordnance Plant at Huntsville, Alabama.

He has had a broad experience in the layout, design, and supervision of constructing electrical distribution, power and lighting systems for many important commercial and government plants.

* * *

Promotion of **William C. Pirie** and the addition of **John B. Stevenson** to the staff are recent changes in the advertising department of the Lighting Division of Sylvania Electric Products, Inc., it was announced recently by **Paul S. Ellison,** director of advertising.

Mr. Pirie, formerly assistant sales promotion manager, has been appointed assistant advertising manager in the office of **John P. Waters,** manager of Lighting Division advertising at 500 Fifth Avenue, New York City.

Mr. Stevenson, formerly in the Boston sales office, is the new assistant advertising manager in the same division, in charge of the advertising office at Salem, Mass. He succeeds **James R. Duffy,** who has become manager of employee activities in the company's industrial relations department. Mr. Stevenson, a native of Pittsburgh, Pa., was associated with Westinghouse before he joined Sylvania.

ARE YOU MAKING FULL USE OF . . . Universal Contribution?

U plan for V day

1 You must identify your store with the "U" Plan decal in order to reap the full benefit of Universal's 40 million advertising messages appearing in 14 national magazines throughout '44.

2 "U" Plan window displays tell customers at a glance that your store is Post-War Planning Headquarters. Display free blow-up of color advertisement appearing in national magazines.

3 We will furnish you with free newspaper mats for the purpose of making announcements in local newspapers that your store is "U" Plan Headquarters.

4 Send out "U" Plan for "V" Day announcement letters and Check Lists to your customers. Returns will create a backlog of potential orders identified as to names and addresses.

5 Set up interior displays to establish a definite Post-War Planning Bureau in a prominent part of your store. Take full advantage of the increased floor traffic.

6 Establish your own priority or preference system for an orderly approach to post-war business. Put tomorrow's business on your books today.

7 Help win the war in '44. Contact your local bond headquarters and arrange to sell War Bonds and Stamps as a patriotic part of the "U" Plan for "V" Day.

Unless you are doing all seven things indicated above, you are not making full use of the "U" Plan. Omit one link in the Plan and you weaken its overall effectiveness. Be a "U" Planner from start to finish. Use all the free promotional material contributed by Universal and profit from the maximum results of a thorough tie-in with the national advertising. If you are not already a "U" Plan for "V" Day dealer, send in the coupon today for complete Plan Book.

UNIVERSAL

LANDERS, FRARY & CLARK • NEW BRITAIN, CONN.

LANDERS, FRARY & CLARK Dept. ES
New Britain, Conn.

Gentlemen:

I wish to become a "U" Plan Dealer — please send free "U" Plan for "V" Day Plan Book to

*Name*_____

*Address*_____

*City*_____ *State*_____

SPREAD THE HEAT AND YOU LENGTHEN THE LIFE

Wide-Area, Low Temperature Heating is the Secret of the Long, Trouble-Free Service of CLARK Electric Water Heaters

There are hundreds of Clark Electric Water Heaters in use today, still functioning perfectly after fifteen and twenty years of service in both hard and soft water. This rugged dependability is convincing proof of the correctness of the famous Clark "Black Heat" principle which makes use of a broad band of gentle heat applied to the outside of the tank.

These first Clark Heaters, like those of the present, are free from liming, scaling and corrosion because this wide-area, low-temperature method of heat application prevents any part of the tank from reaching a temperature high enough to cause these destructive effects. Consequently, long, trouble-free service is the rule and not the exception in Clark Heaters.

P.S.—Sorry, no Clark Heaters are available at this time After Victory we shall be glad to supply your needs.

McGRAW ELECTRIC COMPANY
CLARK WATER HEATER DIVISION
5201 West 65th St., CHICAGO

CLARK *Electric* WATER HEATERS
A TOASTMASTER PRODUCT

C. P. Monaghan has been named manager of the News and Sales Training Section of Edison General Electric Appliance Company, Inc., makers of Hotpoint Electric Appliances.

C. P. Monahan

Mr. Monaghan has been in the advertising and sales department of Public Service Company of Northern Illinois since 1933. Previous to that he was engaged in industrial publicity and advertising.

John L. Mullen, with National Carbon Co., Inc. since 1924, has been appointed Atlanta district sales manager of the company's "Eveready" division. Mr. Mullen succeeds Frank Warnell, Atlanta district manager since Feb. 1, 1938, who has now been promoted to the general sales department in New York City.

* * *

On January 15, **John E. Fontaine** took over the duties of manager at Graybar's Beaumont, Texas, office. He replaces **J. P. O'Neil** who died recently after twenty-seven years of continuous service with the Company.

Mr. Fontaine, a member of the Texas Independent Telephone Association and Petroleum Electric Supply Association, joined Graybar-Dallas in 1928 as a warehouse clerk. Later that year, he was transferred to their Ft. Worth office to handle service. In 1930, he returned to Dallas as assistant power apparatus specialist and since 1931 has been a salesman serving the Ft. Worth and Dallas territories until his recent appointment.

NEW EQUIPMENT and MATERIALS

Switch Maintenance Book

A 28-page booklet of convenient pocket size entitled "Care and Maintenance of Electrical Equipment" and containing simple instructions for keeping switches, panelboards and switchboards in good operating condition. Besides, the book contains a parts ordering list of Square D Electrical Equipment. Illustrated. May be obtained without cost from Square D Company, 6060 Rivard St., Detroit 11, Mich.

New Type Building Wire

A new small-diameter Type SNW Flamenol building wire for wet locations has been added to the standard Type SN Flamenol for dry locations to complete the Flamenol building-wire line, it is announced by General Electric's Appliance and Merchandise Department.

This new Type SNW Flamenol wire has a special thermo-plastic insulation with low moisture absorption. It is designed for use in accordance with Section 3035 of National Electrical Code for installations in raceway systems in wet locations. It is approved by the Underwriters' Laboratories in sizes 14 to 4/0 inclusive.

The insulation of this new Flamenol building wire, Type SNW, in addition to its low moisture absorption properties, has the desirable qualities of Type SN Flamenol Wire insulation. It is superaging, high in dielectric strength and resistant to oils, acids and alkalies. It is flame resistant and will not support combustion. Its temperature rating is 50° C.

This wire is self-protecting and requires no braid. Its finish is hard, smooth and glossy, striped for grade identification. Dirt and foreign matter do not readily adhere to its surface. The small diameter of this wire saves space, permitting more conductors to be used in one conduit.

Instant-Starting Fluorescent

Development of an instant-starting 40-watt white Mazda fluorescent lamp has just been announced by General Electric Lamp Department at Nela Park, Cleveland, Ohio, and Westinghouse Lamp Division, at Bloomfield, N. J.

It has the same rated life when operated with instant starting ballasts as that of the present 40-watt fluorescent lamp which is started by means of the conventional switch, and by "pre-heating."

Limited quantities of the instant-starting lamp will be made available for shipment, on and after May 1, for war production installations equipped with instant-starting ballasts.

Price of the lamp will be the same as that of the standard 40-watt G-E Mazda F lamp. It will bear special marking to permit easy identification.

Instant starting, the lighting experts at Nela Park point out, has been taken more or less for granted by the consuming public because of the instantaneous starting of filament type lamps. Addition of this feature to the numerous advantages of standard fluorescent lamps since their inception will, it is believed, greatly increase the acceptance of fluorescent lighting.

Aluminum High-Bays Available

Super-production of aluminum since 1941 has provided the aircraft industry with an over-abundance, and now the War Production Board has released the use of aluminum for high-bay lighting reflectors. Once again, non-hazardous, accurate light-performing Alzak aluminum high-bays are available.

A new line of high-bays featuring 30°, 60° and 90° beam spreads has just been announced. These high-bays, of three-type light distributions, provide 50° direct light cut-off. Their reflectors are made of heavy-gauge aluminum, and the reflecting surfaces are treated to assure smooth light distribution, and are electrolytically brightened and permanently sealed by the famous Alzak process.

A new engineering sheet listing Guth high-bays illustrates candlepower distribution curves, with mounting and spacing data for each of the three types listed. Sizes for 300 to 1500 watt incandescent lamps, and for 400 watt mercury vapor lamps are available. For further details write to The Edwin F. Guth Co., 2615 Washington Ave., St. Louis 3, Missouri.

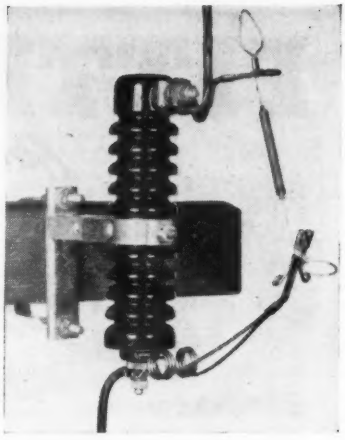
New Flip-Open Fuse Cutout

A flip-open fuse cutout, which provides overcurrent protection by means of a fuse link but without the conventional hinged fuseholder tube, has been announced by General Electric's Transformer Division.

The cutouts, rated 50 amperes, 7500/12,500 and 15,000 volts, have clamp-type line terminals, wet-process solid porcelain insulator, and spring contact arms. The fuse is supported in tension between spring contacts.

When the fuse link blows, the spring tension of the contacts widely separates the severed ends of the link, thereby giving visual indication of the blown fuse from the ground at any angle. A switch stick is used to quickly re-fuse the cutout.

The fuse link is constructed with



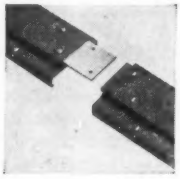
solid wire rings at both ends to permit easy handling with a switch stick. The ampere rating is stamped on the swaged top terminal of the fuse link. The flexible tinned copper cables are of high tensile strength. An enclosing tube of Textolite (Reg. U.S. Pat. Office) covered fiber protects the fusible element from the weather.

Publication GEA-4224, with complete details of the flip-open fuse cutouts, is available from the company at Schenectady, N. Y.

Holdenline Fluorescent Units

The Holdenline Company, 1960 East 57th St., Cleveland 3, Ohio, pioneers in industrial fluorescent, announces a new line of individual fluorescent units and continuous wireway under the name Chan'l-Run, made in standard steel sections of

special design. These units, equipped with Kemilume processed Ligniform reflectors, are so rigidly formed, that while they conform to WPB steel limitations, only one hanger strap is required for hanging each section and an entire row may be assembled complete with reflectors ready to be mounted and quickly connected to line wires, affording marked economies in time and labor.



Connecting Strap

Hanger

Simply designed connecting straps join one section with another, but the basic element in the design is the easily handled steel channel from which Holdenline Chan'l-Run derives its name. For two 40-watt lamps, sections come in two lengths, 48″ and 96″. Similar simplification is indicated in the channels for two 100-watt lamps which are furnished in units of 60″ and 120″ respectively. Individual units and continuous wireway are both fully described in a new catalog, T-44, which the Holdenline Company distributes through its wholesalers or which it is glad to send on request.

Midget Twist-Lock Receptacle

This new 2-terminal Midget Twist-Lock Receptacle No. 2127H (15 amp., 125V.; 10 amp., 250V.) designed for installation in No. 2100 Plugmold still further expands the utility of this "plug-in-anywhere" convenience wiring system for industrial applications along work benches, inspection racks, and assembly lines for plugging in hand tools, test apparatus, appliances or work lights.

The No. 2127H presents the advantages of the standard midget twist-lock receptacle in design and safety. New bulletin covering this fitting will be sent on request to The Wiremold Company, Hartford 10, Conn.

Pedigree

Electrical Insulating VARNISHES

Insure the Life of Your Electrical Equipment

Pedigree Varnishes are prepared with the greatest of care to give them the ability to do the best known job of protecting electrical parts — from oil, greases, acid, alkali, moisture, abrasion, or any other hazard to which your product may be subjected.

There's a Pedigree electrical varnish to meet any situation you may encounter. Whether it's for today's production or tomorrow's plans, specify Pedigree.

The PRODUCT with a PEDIGREE

The P. D. GEORGE CO.

5200 North Second Street, St. Louis, Missouri

Busways and Wireways

A complete bulletin on Saflex Plug-in Duct, Saflex Feeder Duct, Square-Duct and Screw Cover Duct for electrical distribution systems is now available. It includes complete description and application data, price information and understandable illustrations. For a copy of the 36-page book, write Square D Company, 6060 Rivard St., Detroit 11, Mich.

Texrope V-Belts

A new 44-page bulletin describing its complete line of Fractional Horsepower Texrope V-Belts and Sheaves has been released by Allis-Chalmers, Milwaukee.

Bulletin B6249 offers simplified enngineering data for fractional horsepower drives can easily be derived.

Amply illustrated with installation photographs, line drawings and selection tables, the bulletin will be of interest to manufacturers and operators of light duty power tools, fans, blowers, pumps, stokers, oil burners, processing equipment, numerous appliances.

For complete fractional horsepower drive information, send for Bulletin B6249. Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.

Large Synchronous Motors

A colorful, 4-page folder illustrating motor construction and engineering design is now available. Motors are available beginning with minimum ratings of approximately 300 horsepower, speed 500 rpm, and higher, and are of the coupled, pedestal-bearing type. Synchronous motor control is discussed, with illustrations. Write for your free copy, Publication No. 173, Electric Machinery Mfg. Company, Minneapolis 13, Minn.

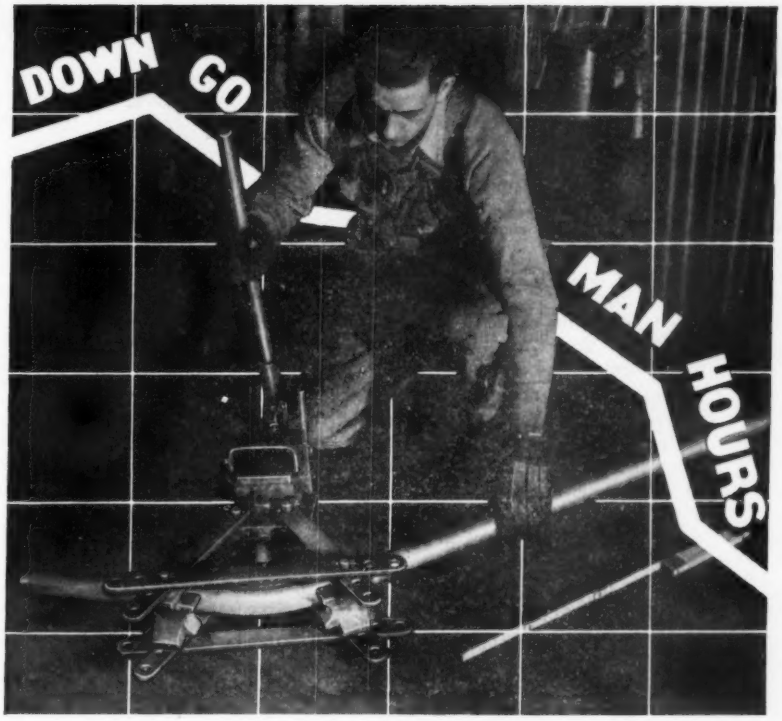
Etcher and Demagnetizer

The Ideal Commutator Dresser Co., 1017 Park Ave., Sycamore, Ill., has developed a new tool that is ready for instant use as either an etcher or demagnetizer. It is enclosed in an attractive case with a removable hinged cover.

To etch small tools and parts, simply place them on the work-plate, turn switch "on" to proper heat and start etching. A ground clamp is provided for etching parts too large for the work-plate.

Fourteen heats (Lo-90, 150, 200, 250, 350, 450, 600; Hi-300, 400, 500, 650, 850, 1100, 1350 watts) are provided by "Hi-Lo" tap and 7-point switch. This gives a wide range for marking all iron, steel and their alloys from small, delicate parts up to large, smooth castings.

To demagnetize, it is only neces-



...when you bend pipe with a GREENLEE

TIME-SAVING TOOLS FOR ELECTRICAL WORK

BENDERS. Complete line of powerful hydraulic and hand benders for every bending job; pipe up to 4½"; rigid and thin-wall conduit; steel, brass and copper tubing; bus-bars.

CABLE PULLERS. Makes the tough job of cable pulling easy. Pulls cable into exposed or concealed conduit in half the time required with cumbersome equipment. Easily carried, operated by one man.

JOIST BORERS. The convenient, work-saving way to bore holes in joists for knob-and-tube wiring and for conduit. Ball bearing operation. Easily assembled.

KNOCKOUT TOOLS. Greenlee Knockout Punches and Knockout Cutters save hours of work in cutting smooth accurate holes. Enlarge holes without drilling, reaming or filing.

RADIO CHASSIS PUNCHES. A special Greenlee tool for cutting holes in radio chassis for sockets, plugs and other receptacles. Cuts or enlarges holes in a jiffy. A big time saver for the radio worker.

PIPE PUSHERS. One man easily pushes pipe through ground by powerful hydraulic action. Eliminates extensive trenching, tearing up lawns and pavement in installing pipe.

The Greenlee Hydraulic Bender above has been in use fourteen years at Squire Electric Co., Kansas City, Mo. C. F. Miles, General Superintendent, finds it cuts their labor hours in two on bending jobs. And he tells us it's especially valuable when uniform bends of the same radius are required.

Ask leading electrical contractors everywhere and you'll find Greenlee Benders the leaders in the field. Speed, accuracy, easy operation, portability and fast set-up . . . all make for important savings in time and materials. Smooth, accurate, uniform bends are produced in less time, with no kinks or serious damage to conduit finishes.

The well-equipped contractor knows good tools are essential to modern electrical installation work. And it's a vital matter under today's critical man-power conditions.

WRITE FOR FREE BENDER BOOKLET S-116
So get the facts now on Greenlee's complete line of hydraulic and hand benders for every bending job. Write for Bender Booklet S-116, also Catalog 33-E on Greenlee time-saving tools for electrical work. Greenlee Tool Co., 1764 Columbia Ave., Rockford, Ill.

Get Ready with Greenlee!

REGISTERED TOOLS
GREENLEE
FOR THE CRAFTSMAN

sary to turn the switch "on" to either No. 1 or No. 2 position and proceed as with ordinary demagnetizer. Maximum rating is 5.5 ampere. Over-all pole area, 13½ square inches.

Servicing Sealed System Refrigerators

(Continued from page 32)

der to get to the top of the shell and then to the intake tube. Any oil or liquid refrigerant is separated from the vapor by centrifugal force due to rotation of the motor rotor, as vapor passes up through the holes in the rotor. Consequently oil and liquid separation is assured, oil "slugging" is eliminated and with it the danger of valve breakage.

Oil is picked up in a small slot on the end of the crank-shaft, which acts as a centrifugal pump and the oil is forced into the lower main bearing. From this point it follows the spiral groove in the bearing up to the crankcase where it lubricates the thrust plate, connecting rod and piston. Oil is then pumped through a tube by vapor action, up to a small reservoir beside the upper main bearing and is then fed into and spiraled up through the bearing from where it drops back to the sump. Valves and top cylinder are lubricated by means of a very small tube which introduces into the suction chamber, a minute amount of oil each stroke of the piston. Number 10 indicates the discharge part of the compressor and 11 is the motor terminal.

Continuing with a description of the sealed assembly illustrated in Figure 4, we will describe the electrical parts, their operation, the wiring and service.

Electrical Service

The motor used in this assembly is a split-phase start, induction-run type; when running it is a singlephase induction motor. A capacitor start motor is also used in some sealed units.

Single-phase induction motors are not self-starting. A common method of starting single-phase induction motors is that of introducing a second out-of-phase magnetic field in the stator during the starting period. In this motor, a starting winding is wound on the stator, shifted out of phase with the main winding. By means of a relay, this starting winding is in the circuit when the motor circuit is closed.

The current through the starting winding introduces the second out-of-phase magnetic field in the stator and starts the motor. As the motor speed increases, the current is reduced. At a predetermined condition, the line current will warm the relay thermal element sufficiently to open the contacts, thereby taking the starting winding out of the circuit. Figure 5 is a typical wiring circuit showing relay, motor, cabinet light switch and sealed assembly.

A combination relay and overload protector is shown in Figure 6. The thermal element of the relay carries all current going to the condensing unit motor. When the thermal element is carrying no current, (thermostat off) both relay contacts are closed. As soon as the thermostat cuts in, the relay contacts (which are closed) allow the current to flow through the starting and running windings and the unit starts. The thermal element warms rapidly and lengthens, allowing the spring to pull the arm around. The relay contact then remains on the running position and stays there during normal operation. In this position the starting contact is open and the overload contact is closed. If for any reason, the unit should draw excessive current, elongation of the thermal element continues and the thermal overload contacts open. (When the thermostat cuts out after a normal cycle, the thermal element cools and the switch returns to the starting position after a minute or two.) After a minute or two of cooling, both movable contacts return to the starting position. The time required for the thermal overload to reset fluctuates with room temperature.

When the thermostat cuts off after a normal cycle, or when the switch is turned off after a normal cycle, the starting contacts remain open for the length of time required for the thermal element to cool. If the switch is closed during the few seconds interval before the starting contacts again close, the unit will fail to start and the overload will operate. This is not an indication of unit failure, it is a normal function of this type of relay.

The electric range unit for all replacements
• Simplifies servicing
• Fits all ranges
• Cuts servicing cost
• Cuts inventories
• Pleases customers
CHROMALOX
HEATFLO
Chromalox Super-Speed rings and parts available without priority — under WPB Order L-65.
EDWIN L. WIEGAND CO.
7600 Thomas Blvd., Pittsburgh 8, Pa.
Representatives
ATLANTA, GA.—C. B. Rogers, 1000 Peachtree St., N. E.
DALLAS, TEXAS — L. R. Ward, 403 Southland Bldg. Annex.
RALEIGH, N. C.—W. R. Phillips

Neither the split-phase or capacitor type motors, as commonly used in sealed systems, will start with a load on the motor. The relief of this load is accomplished in one of two general methods. Either a by-pass valve is located in the discharge side of the cylinder head or the high side relieves or equalizes its pressure into the low side during the off cycle. The relief or by-pass valve, opens the discharge side into the suction side of the compressor until the compressor is up to speed. Consequently, no period of time is required for unloading and the unit will start any time after the relay has cooled sufficiently to close.

When the discharge side is relieved during the off cycle, it is done over a period of time. The length of time depends upon the design; it may be from two to five minutes, depending upon the design and the part of the cycle at which the unit was stopped. If the starting switch of the unit is turned on before the relief period is over, the flow of current through the relay will be great enough to cause the overload contact to open. The relay will continue the overload cycle of heating and cooling until the discharge pressure is low enough for the motor to start with the load. It will then function normally.

Defective Fuses Cause Hard-to-Find Trouble

(*Continued from page 30*)

es and testing the circuit, including the traveling cable under the elevator car, it was discovered that one of the fuses in the control circuit of the motor-generator set motor was defective. At times it would allow enough current to flow to light a test lamp and energize the magnetic starting contactors. At other times it would fail to do either. A new fuse was substituted and the trouble was cleared up.

The defective fuse was cut open, and this revealed that the fusible link had either broken, or melted from overload, leaving the ends touching at times.

Probably a good course to follow is to replace fuses whenever a circuit gives trouble, and to test the questionable fuses after first jarring them sharply to separate the ends of defective fusible links, if possible.—*Thomas Trail, Baltimore, Md.*

How to Select
INSULATING TAPES

Keep these facts in mind when selecting insulating tape:

A. The base cloth must: (1) have ample mechanical strength; (2) be chemically inert; (3) contain minimum sizing to permit thorough penetration by the insulating varnish and prevent weakening of the fiber in service.

B. The varnish must: (1) be neutral in relation to the cloth; (2) impart maximum dielectric strength, flexibility and resistance to heat, oil, water or other damaging agents against which the particular tape is to give protection.

C. A ready source of supply for all types of insulating tapes must be available. Your local G-E distributor handles a complete line of tapes, as well as all other insulating materials, and can furnish detailed data and catalog on request. Or send for catalog to Section M442-16, Resin and Insulation Materials Division, General Electric Co., Schenectady, N. Y.

★ BUY WAR BONDS ★

GENERAL ELECTRIC

Maintenance and Use of Electrical Instruments

(*Continued from page 24*)

particularly in the case of millivoltmeters used with shunts. Lead wires should extend away from the observer to avoid accidentally pulling the instrument off the table.

3. Whenever a shunt is used with a millivoltmeter to read current, always check to make sure the leads with which the instrument was calibrated are being used.

4. If external resistance multipliers are used, check both the serial number of the instrument and that of the multiplier to make sure of the correct combination.

5. The instrument zero setting should be checked. If the pointer is slightly off zero, reset to zero by adjusting the external zero shifter.

6. The instrument should not be used in strong fields, such as near cables or bus bars (see Fig. 3). Presence of a magnetic field which is affecting the reading of an instrument can be detected by turning the instrument (clockwise or counterclockwise), 90 degrees at a time, and taking a reading in each position. If a difference is noted in the readings, some stray field is present.

7. Unshielded instruments should not be placed close together, as the reading of one instrument may be affected by the magnetic field of the other.

8. When an ammeter or shunt is to be connected into a circuit, always connect it into the grounded side, if possible.

9. When a voltmeter is to be connected to a circuit, always connect the leads to the instrument first. This avoids loose leads which may be "hot." Be sure that voltmeter leads are properly insulated for the voltage to be checked.

10. Instruments, shunts, and leads should always be arranged in such a way that there is no danger of knocking them off the table or tripping over the leads; and if any high voltages are to be measured, the arrangement should be such that no one might accidentally touch the high-voltage equipment.

11. Whenever an instrument is to be connected to a current-transformer secondary always short-circuit the transformer secondary terminal before the primary is connected in the circuit to avoid dangerously high voltages. The current transformer secondary circuit must be grounded.

Switchboard Instruments

1. Switchboard instruments should be mounted on panels in accordance with the manufacturer's instructions.

2. Never mount a switchboard instrument on a panel until all other work on the panel is completed, as any pounding or vibration may affect the instrument.

3. The general precautions given under Portable Instruments also apply to switchboard instruments.

Utility Executives Appraise Markets

(*Continued from page 25*)

utaries did in Oklahoma last year in the wholesale destruction of farms and other property. I estimate that fully 25 feet of silt was deposited behind the Grand River dam in that flood," Mr. Peterson continued. He cited authorities who predict that the Boulder dam —"daddy of them all"—will be filled with silt and rendered absolutely useless within five generations.

Pronounced divergencies between the New Deal and the fundamental principles of our government as expressed in the federal constitution and declaration of independence were pointed out by J. C. Happenny, president, Oklahoma Power and Water Company, Sand Springs, Okla., in a paper entitled: "Keeping the Record Straight." The whole of our 175 years of existence as a nation have demonstrated the strength of individual ownership and enterprise as the principle of our prosperity, Mr. Happenny asserted.

The speaker charged that one branch of the government creates conditions which gives one competitor an advantage over the other. He declared that the Rural Electrification Administration in Oklahoma has been subsidized through relief from taxation and other advantages to the equivalent of 3.5 cents per kilowatt-hour. This agency has departed from its original purpose of extending electricity to the farms to become a socialistic project to compete with private industry, Mr. Happenny asserted.

An ambitious industrial development program for all of Oklahoma is being planned by the Oklahoma City Chamber of Commerce, Oscar Monrad, manager, industrial division of that organization, told the utility people. A drive to bring new industries into Oklahoma and to encourage growth of those already in the state will follow a

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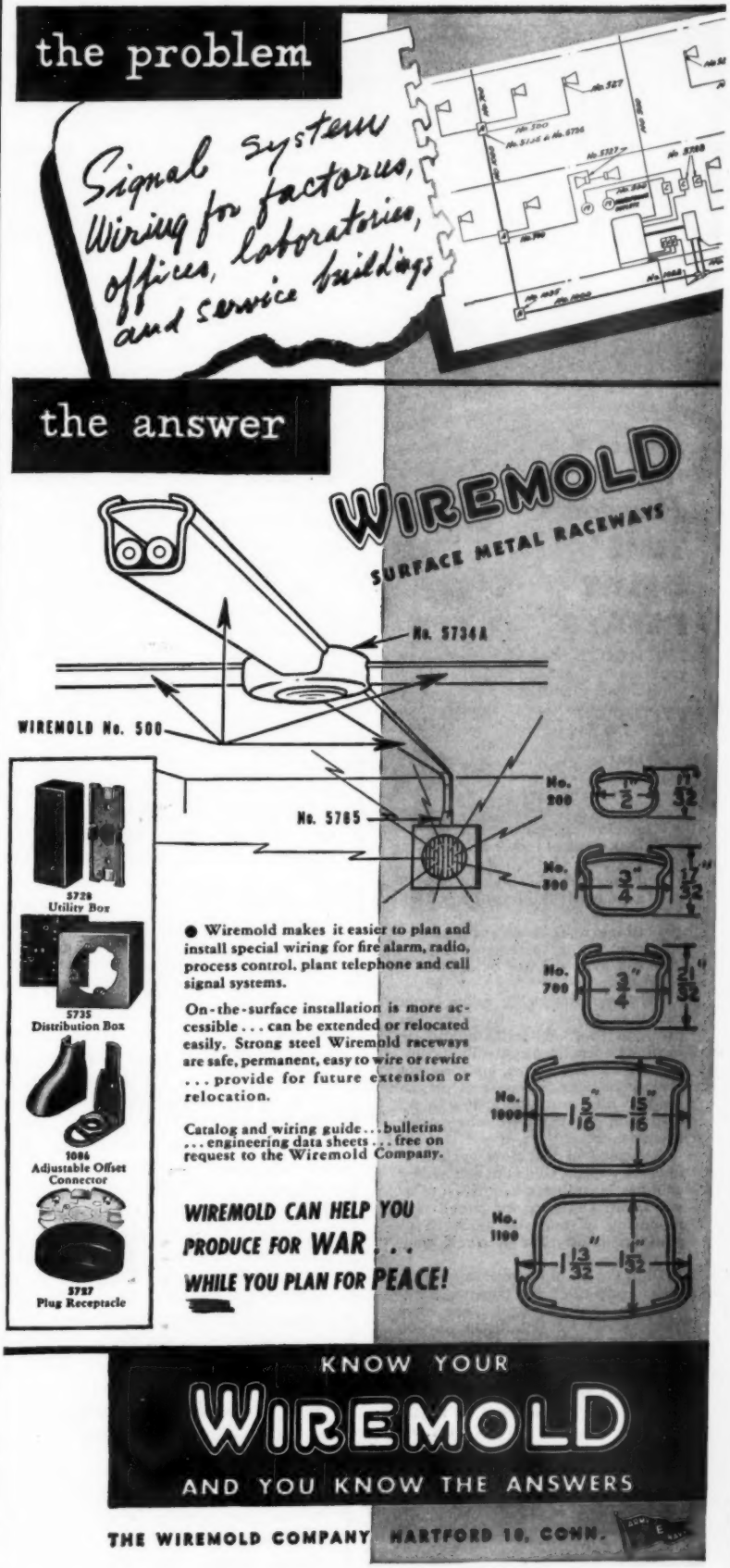
statewide survey soon to be launched, Mr. Monrad said.

Various phases of post-war planning were discussed in the electric light and gas divisions meetings held simultaneously in separate rooms during the afternoon. "Stabilization and Post-war Problems of Employment" were presented in a discussion led by J. A. Whitlow, vice president, Public Service Company of Oklahoma, Tulsa. He said that it had been estimated that by 1946, if the war is over by that time, there will be about 19,000,000 persons unemployed. If the government should attempt to administer relief to these men amounting to $2.00 per day, the annual expenditure for that purpose alone would be approximately 14 billion dollars, Mr. Whitlow estimated. The public utilities and other industries should begin planning now to take up a part of that lag and to shorten the time as much as possible when government will feel justified in furnishing employment relief.

A census or survey should be taken now in each community to determine the different skills which can be utilized there, how many men can be employed after the war and to determine in advance, so far as possible, where men can be placed. "It seems to be a terrible waste that a person out of a job must look and look for the work to which he is adapted when a canvass of the unemployed and of industry could help the right men to get together," Mr. Whitlow said.

An employee information program being conducted by the Oklahoma Power and Water Co., of Sand Springs, Okla., was outlined by Victor E. Hulett, vice president of that company. Employees, their wives, and close friends, meet regularly in scheduled groups of from ten to twenty members, two hours, twice a month on company time. Department heads act as leaders who use a prepared text in the discussions, but everyone is given an opportunity to express his own opinions. The text deals with purposes and fundamentals of our government, alien "isms," encroaching control, relationship of government and business, the American system, American free enterprise in the future, history and characteristics of the utility business, holding companies, regulation, utilities in the war, and other subjects.


the problem
Signal systems
Wiring for factories,
offices, laboratories,
and service buildings
the answer
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SURFACE METAL RACEWAYS
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● Wiremold makes it easier to plan and install special wiring for fire alarm, radio, process control, plant telephone and call signal systems.
On-the-surface installation is more accessible . . . can be extended or relocated easily. Strong steel Wiremold raceways are safe, permanent, easy to wire or rewire . . . provide for future extension or relocation.
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PROTECT IT WITH **Paragon TIME DELAY RELAYS**

Approximate size of 800 Series, 4½" high, 2 5/32" wide, 1¾" deep.

NOTHING is more vital to the war production program than electrical equipment. Guard it with Paragon automatically reset, synchronous motor operated time delay relays, which:

1. Protect rectifiers and tube filaments from application of plate current before filaments are preheated.
2. Accurately control the various steps of motor acceleration.
3. Dependably delay the closure of elevator control circuits.
4. Stagger the closure of multiple circuit systems so that full load will not be applied at start.

Paragon Time delay relays have countless uses . . . for example: machine tool control, therapeutic machine operation, controlling compressor bypass valves, split second control of light exposure in photographic, blue print and X-Ray work, operation of pneumatic tube carrier systems, etc.

Accuracy of the time cycle and operation of the timer not affected by changes in ambient temperature or vibration. Designed for panelboard mounting or may be mounted to standard handy box or single gang switch box.

Built by an organization of engineers and skilled craftsmen specializing on electrical equipment since 1905. Write for a bulletin on 800 series Time Delay Relays.

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BUILDERS OF ELECTRICAL EQUIPMENT SINCE 1905

Post-war planning also furnished the principal theme for the gas division meeting. Subjects presented, followed by discussion, included: "Post-war Planning to Maintain Gas Load," by Cy Young, research engineer, The Gas Service Company, Kansas City, Mo.; "There Ought to Be a Law" (relating to laws, ordinances, and regulations to secure installation of better appliances and more adequate venting of homes) and "All Weather Air Conditioning," by John A. Gilbreath, assistant manager of air conditioning division, Servel, Inc., Evansville, Ind. The latter speaker not only outlined the great demand which will exist after the war for year-around air conditioning, and the increased market it will afford for gas, but also the opportunities it will offer to electric utilities in connection with equipment supplemental to operation of the gas air conditioning units now being perfected by his company and to be placed on the market as soon as possible after the war is over.

E. C. Joullian, president, Consolidated Gas Utilities Corporation, Oklahoma City, presided over the general session as president of the Association. The electric division was led by F. J. Meyer, retiring chairman of that division, and vice president of the Oklahoma Gas and Electric Co. That division elected as its chairman for the ensuing year, S. I. McElhoes, director, Public Service Company of Oklahoma, Tulsa.

A. F. Potter, vice president of the Association and manager, The Gas Service Co., Bartlesville, Okla., presided over the gas division meeting. The new chairman of that division, elected at the meeting, is L. A. Farmer, president, Northern Oklahoma Gas Co., Ponca City, Okla.

The board of directors elected George A. Davis, Oklahoma City, president, Oklahoma Gas and Electric Co., as first vice president of the Oklahoma Utilities Association to succeed George M. McLean, of El Reno, deceased.

Dealer Problems In Warwork Boom Towns

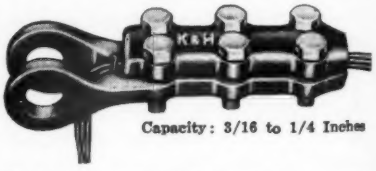
(Continued from page 15)

In service, too, the McDavid company has had to follow somewhat the same technique. No pick-ups or deliveries are made. Only items repaired are those coming in over the counter, and that is pretty much the policy with all Mobile dealers, harried as they are by the shortage of help and increased volume of business. Neither are any free check-ups made. If a customer wants to leave the appliance with an order to fix it, this is done of course, but it may be a week before it is reached. Mechanics are scarce and for that reason part-time workers are used to a certain extent, that is, a craftsman after doing eight hours at a shipyard plunges in and for a few more hours repairs radios, fans, pressing irons or whatever is most pressing to do.

Such is the story of Mobile, the No. 1 city in the United States as far as increase in population as a result of the war is concerned. More than 10,000 new houses have been built in an effort to take care of this increase and these new comers had to be fitted out as far as possible. The McDavid company in one contract supplied 261 refrigerators and 261 stoves to one housing project, this being

A Live Wire is no better than its Connections

DEAD END CLAMPS
for Stranded Conductors



Capacity: 3/16 to 1/4 Inches

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New LEAD SLEEVE feature protects each strand against abuse thru contact with each other as well as from direct contact with the gripping portion of the clamp itself. Under strain test, cables have been stretched to the breaking point without marring the individual strands held in clamp. No removable parts.

• WRITE FOR BULLETIN 12-A •

K&H KRUEGER & HUDEPOHL
Solderless Terminal Lugs and Connectors
VINE AT THIRD-ES • CINCINNATI, OHIO

done under the necessary priorities. But aside from this, to take care of the drop-in trade has taxed the facilities of all dealers, and made it such that an appliance not for sale had to be hidden to save answering a lot of questions. It is conditions like this that has kept dealers on the move in Mobile and caused the cycle of "reverse selling" as explained by Mr. McDavid.

Wiring for Electrical Living in Postwar Homes

(Continued from page 12)

percentage of service calls, including those of changing fuses, are caused not by defects or imperfect performances on the part of the appliances, but by poor wiring, overloaded circuits, insufficient outlets, and improper and antique circuit protection.

Any program that increases the appliance load in the average home must be accompanied by a well-organized wiring activity. It is hardly fair to sell a plug-in appliance and leave it in the "laps of the gods" or the wiremen and the new owners to find a means of connecting this new unit to the electric system. Far too often the housewife accomplishes this with a three-way plug gadget purchased from the five and dime store, adding to the burden of an already overloaded circuit.

Every appliance, be it of the small table variety or a major unit, has a wiring characteristic and should be sold with full knowledge to the purchaser that only when these characteristics are satisfied will the appliance render its intended efficiency.

The National Adequate Wiring Bureau has struggled long with this problem. Some progress has been made—a great deal remains to be accomplished. It is an industry problem, the solution of which will require an *all-out coordinated effort* on the part of every utility, every electrical manufacturer, every architect, every engineer and every contractor as well as bankers, insurance companies and Federal Financial Institutions—if the goal of full appliance use is to be accomplished.

Realizing the importance of this matter, we have developed an educational program for use by the utility and the electrical manufacturer, for the architect, the engineer, the builder, the contractor and the wireman, the

. . 1 head is better than 2!

For 25 seconds, the bombardier is both that and pilot. No time for two heads to get together. In those paltry moments, about half the time you need to read this, he must make a number of sighting adjustments. Speed, bomb fall, range, and drift must be precisely related to score "on the nose" hits. All, in 25 seconds. Who, then, will steer the ship?

★ Of this need, the Norden Automatic Pilot was born. Holding the plane level and true on its course, while lightning answers to knotty mathematical equations are "figured" by the electric computer, is the automatic pilot's job.

★ And number one among our jobs is the production and delivery of those automatic pilots and electric gyro motors for the Norden Bombsight System. We like to think that the five years we've been at it help make things easier for the bombardier . . . for the 25 seconds that count.

★ Do you want to get "on target" with any problem involving electric fans, motors, machine drives, hoists, cranes or Moyno pumps? If you do or need repair parts for R & M Fans—or want complete repair jobs done *for* you—get in touch with us, or the nearest R & M branch office listed below.

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SPRINGFIELD, OHIO • Branch Offices in:

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"All SIZES of SERVICE CONNECTORS—

from No. 10 to 1,000,000

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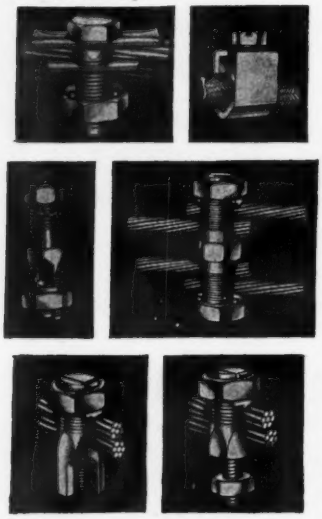
You can find exactly the service connector you need, in the Penn-Union Catalog: Yoke-and-Nut type, in a complete range of sizes . . . Service Entrance connectors . . . Service Post and Special connectors in wide variety.



Also . . . the most complete line of Tee Connectors, Cable Taps . . . Straight, Parallel, Elbow and Cross Connectors . . . Bus Supports, Clamps, Spacers . . . Grounding Clamps, Terminal Lugs . . . practically every good type.

Leading utilities, industrials, electrical manufacturers and contractors have found that *"Penn-Union" on a fitting is their best guarantee of Dependability.* Write for the Penn-Union Catalog.

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banker and the insurance companies.

The program will be summarized in a brochure *"Electrical Living in* 194*x."* It is designed as an educational presentation for the architect, the engineer, the builder, the contractor, the wireman, the banker, the insurance company, and building management. Dedicated to the consumer, it builds a story of comfort, convenience, the joy of electrical living, and the fundamentals necessary to its efficient operation.

A room by room pictorial-story will establish in a practical way the advantages of the electrical way of life.

Four basic premises are:

(1) Insist on enough outlets for present and anticipated appliance and lighting needs.

(2) Insist on enough circuits to distribute the electrical load properly.

(3) Insist on modern protection for all electrical circuits.

(4) Insist on wiring and wiring devices of high quality.

Lighting techniques—wiring and electrical terms—are defined and illustrated. Common wiring deficiencies which exist in 95 per cent of America's homes today are graphically depicted.

The processes of transmission from the transformer on the pole, through the meter, entrance switches and distribution panels, to every outlet, to every light, to every appliance is clearly shown.

A master floor plan of a modern two bedroom residence charts circuit by circuit the results of a most carefully developed wiring program. The wiring in each room is designated by a separate color. The fundamental need for each branch circuit is clearly established.

With the plan before you, the pages unfold room by room—appliance by appliance—lamp by lamp—the wiring requirements of each piece of equipment—a story that has never before been too clearly told. Here is a picture of the hidden requirements essential to efficient electrical home operation, to broader appliance use, to greater user satisfaction.

Yes, the clearing of the inadequate wiring bottleneck is a *must* to the architect, the engineer, the builder and the contractor in developing a better housing package in the home of tomorrow, whether it be a new or modernized residence unit.

To the utility—it is a must to post-war domestic load building programs.

To the banker—the insurance company which invests its funds in mortgages—and the Federal Financial Institutions which insure the loans—it is a **must** to sound investment.

To the building manager—and to the realtor—better wiring will eliminate a basic and expensive headache.

To the manufacturer, distributor or retailer of electrical equipment supplies and appliances—it is a *must* to his future business.

It is an industry problem that will take the wholehearted cooperation—a carefully coordinated program—participated in by every branch—every individual in the housing industry and its allied interests.

The Adequate Wiring Bureau has long struggled with this problem—some progress has been made. Much, however, remains to be accomplished.

Editors have been most generous with the pages of publications in charting the paths of the various industries of our national

BUILD UP
MORALE
ON THE FIGHTING FRONT

A gun doesn't need morale, but the man behind it does. Send him cheerful news from home . . . often.

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1915 - 1944

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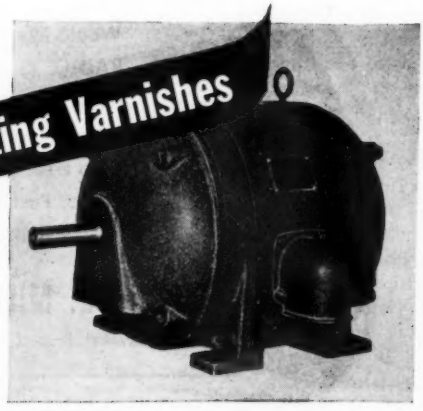

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If you repair fractional or large H. P. motors, it is essential to consider variations in construction and operating characteristics when selecting insulating varnishes. You will find a DOLPH Insulating Varnish to meet requirements.

Why not consult us with your insulating varnish problems? We will be glad to assist you in selecting the proper grade of varnish so that in the long run, you will reduce costs and still turn out good work.

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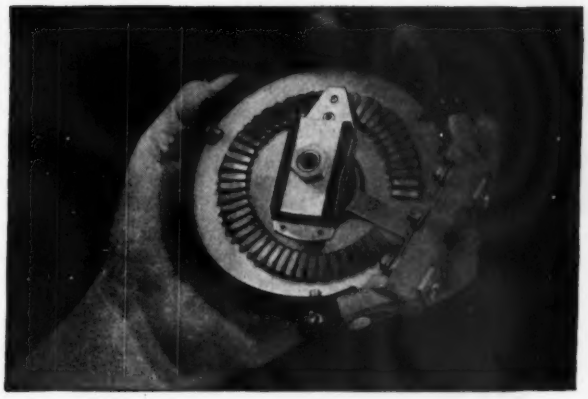
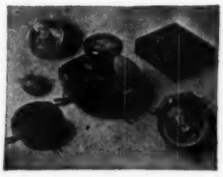


A Small Rheostat with *BIG* Features

THE FACT that a Rheostat is small, in no way diminishes the importance of its functioning.

Ward Leonard recognizes this and has produced their 4" Plate Type Rheostat with all the desirable features of their largest equipment. It dissipates heat from both sides. The contacts are solid metal blocks for durability. Action is smoothness itself. There are forty-three steps of control.



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Bulletins are available describing the various Ward Leonard Rheostats. The line is complete including from the small ring types up to the heaviest duty, multiple mounted, power driven units. Write for data bulletins describing the type of Rheostats of interest to you.

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Electric control WL *devices since 1892.*

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NO RESTRICTIONS

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Telephone: Preston 1610

economy. The courageous approach of many publications to innumerable knotty problems has contributed greatly to raising the American standards of living. Editorial guidance has been an important factor in integrating the housing industry.

Visualize if you will the need for better wiring in our American homes. It is a major challenge to the many branches of the housing industry whom you have for so long and so effectively assisted to chart a course to a new and stronger economy—a better—bigger nation.

The Electrical Job In the Postwar Home

(*Continued from page 8*)

Today there is evidence in many electrical centers that our industry is aware of the part it must play in the electrical job in post-war home building. We are aware that the time for planning is here and that means *action now.*

In New Orleans the Home Service Dept. of Public Service is conducting group meetings in which the A. W. theme is introduced in connection with the proper care and use of eletcrical equipment. E. H. Mowen, acting manager, Residential Division, has advised that a continuous training program for their Home Service Dept., one meeting each week, features the principles of adequate wiring.

Sponsored by the Peoples Bank of Cumberland (Md.) a Home Ownership Savings Club is now holding regular meetings as part of an educational and informative plan to encourage postwar home ownership. The Potomac Edison Company will cooperate by presenting the subject of adequate wiring in post-war homes at one of the sessions. The only requirement for membership in the Club is adoption of a plan of regular saving, preferably through the medium of war bonds.

A meeting sponsored by the Electrical Clearing House of Louisville, Ky., for the entire building fraternity is being scheduled for this month (April) at which the story sketched in this article will be presented.

At Lexington, the Kentucky Utilities Co. is talking about the value of adequate wiring in its customer contacts, and, according to R. W. Wilson, manager, Commercial Service, is also giving space to A. W. in their two monthly publications, carrying the message on bills and has plans to develop window displays and use newspaper advertising. More direct contacts, through group meetings, in schools, etc., will be made, Mr. Wilson says, as soon as materials are available.

In Chattanooga, a city that has always been in the forefront of wiring promotion activity, comes word of a local builder who is now announcing plans for 80 post-war homes. Paul J. McMillan, residential customer supervisor of the Electric Power Board, advises that all 80 homes will be adequately wired for postwar electrical homemaking will have all-electric kitchens and include electric ranges, refrigerators and water heaters furnished with them.

These activities are typical of the alertness of the electrical industry of the South to the need for action now to aid the building fraternity meet its most challenging problem.

RADIO

Would like to contact RADIO manufacturer looking for representation in greater Chicago area. Commission basis. Postwar sales. Please write.

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20 No. Wacker Dr. Chicago 6, Ill.

All Varieties of
Subox
ANTI-CORROSIVE PAINTS
ARE AVAILABLE
For Immediate and
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Delivery
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BURNISHER FOR COMMUTATORS and RINGS

Easy to Use as Shown

Do the Work While Machine is Running

- Removes film with no dusting
- Keeps motors and generators fit—to last longer
- Hones commutator or ring to a mirror face
- Restores commutation to normal
- Reduces sparking and brush wear
- Styles for all sizes of commutators and rings
- Sold under absolute guarantee of satisfaction
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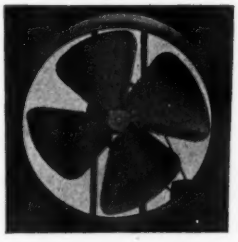
THE "*Fresh-Air* MAKER"



provides fully the comfort and ventilation so essential in army barracks, mess halls, hospitals, headquarters, theaters and other military buildings. Its fine design and sound construction meet the specifications drawn for army fans and it is particularly adaptable to the various types of installations found in army buildings.

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Single Inlet—Double Inlet. 400 CFM to 12,500 CFM.

Single Inlet Blower illustrated at left is particularly adapted for ventilation of mess halls in military establishments.

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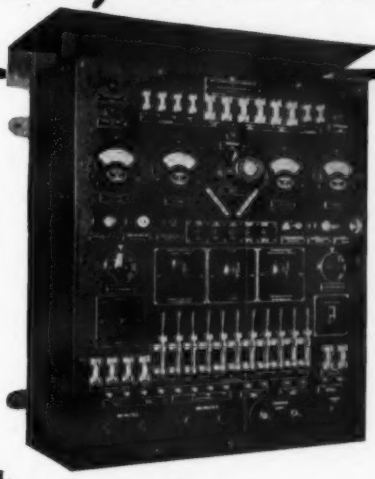
of Every Type
Including MARINE WORK



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WORK TEST PANEL
—built to customers' specifications and Navy standards.

RADIO MOTOR-GENERATOR and SELECTOR CONTROL PANEL
—built to customers' specifications for any number of circuits.

ALL types of electrical specialties, boxes, cabinets, control panels, duct-work, etc., manufactured by an organization accustomed to meeting exacting Army, Navy and Commercial specifications. Full engineering personnel and equipment for manufacture of special electrical items to customers' needs in addition to all standard articles. Let us quote you on your requirements. Write for illustrated catalog.

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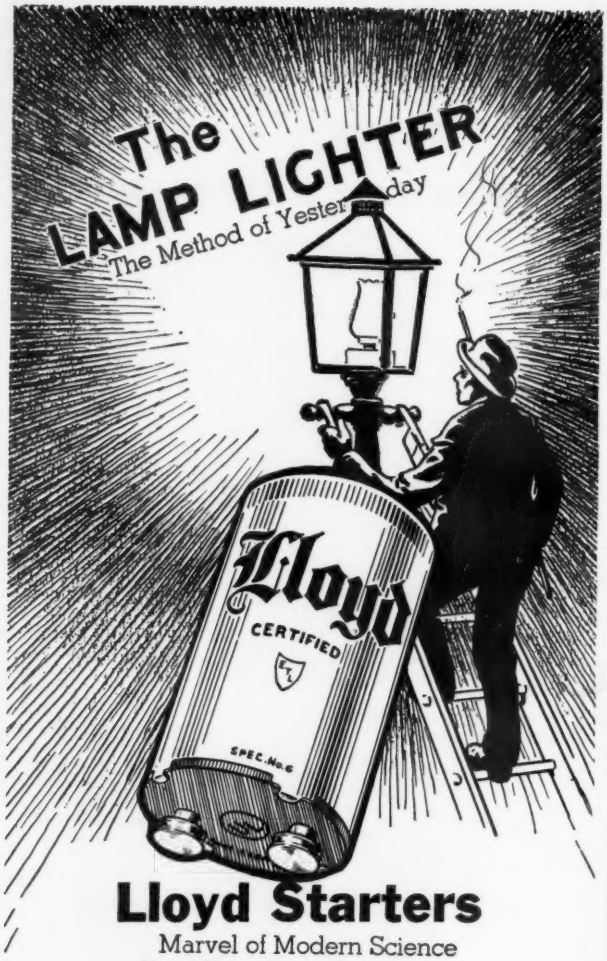

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